NERVE DAMAGE AND DEFORMITIES IN LEPROSY

- Basic anatomy, physiology and pathology -

A comprehensive technical guide

for service providers at

Leprosy Referral Centres (LRCs)

LEAP
Leprosy
Elimination
Action
Programme

Association for Leprosy Education, Rehabilitation and Treatment – India

B 9, Mira Mansion, Sion (West), Mumbai – 400 022; Tel: 24033081; Fax : 24017652 ; Email: alert@bom5.vsnl.net.in

Enhancing the knowledge and skills of trained leprosy workers . . . .

The major thrust of ALERT-INDIA's efforts through **Leprosy Elimination Action Programme (LEAP)** is to provide quality services to leprosy affected persons during the integration phase. The primary concern is to strengthen the Leprosy Referral Centre (LRC) at the district and block level as a means to provide comprehensive care to all leprosy patients with nerve damage, both new and old, specially who are cured with residual deformities and disabilities.

Towards this end, LEAP has taken initiative to improve the logistics and infrastructure of the general health care services. Physiotherapy at LRCs can play a major role in the prevention of deformities and its management with exercises, wax-therapy, muscle stimulation, splinting and ulcer care.

This guide is intended to provide technical knowledge on basic anatomy, physiology and pathology related to peripheral nerves, skin, muscles, joints and eyes that are required by the service providers managing LRCs. This guide is specifically aimed to enhance the knowledge and skills of the trained health workers.

Additionally, this guide also serves as a ready reference on the uses of physiotherapy equipments and disability aids. The techniques described under each treatment modality are limited to deformities that are commonly seen in most leprosy affected persons.

I acknowledge the efforts made by ALERT-INDIA team: Mr. S. Kingsley, Dr.V.V.Dongre, Mr. A. B. Prabhavalkar and Mr. Rajeev Dudhalkar in compiling the contents of this technical guide.

Hope this guide will help the general health workers to be an informed service provider through LRCs at secondary level health institutions.

Sion, Mumbai
10.11.2008

A Antony Samy,
Chief Executive, ALERT-INDIA

B 9, Mira Mansion, Sion (West), Mumbai – 400 022; Tel: 24033081; Fax: 24017652; Email: alert@bom5.vsnl.net.in

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1

Basic sciences for PMWs

1
Basic sciences for PMWs

Dis-ease
Health – Body, Mind, Society - Balance
Doctor – PMW – Patient

Aim
Cure the sick – Detection and Treatment
Maintain health of healthy
Prevention of diseases

Why health is needed?
Individual – Community – Villages, Cities – Districts – States – Nation
Health = Development = Progress

Study of basic sciences helps in knowing
- Place of disease
- Process of disease
- Progress of disease

Change in the structure and functions of the body.

End point of any disease
Recovery
Deformity and / disability
Death

Leprosy – Ubiquitous
Not skin deep
Systemic

Anatomy – Study of structure of body.
Physiology – Study of functions of body.

World – Non living
Living - plants, animals
Living - unicellular
multi-cellular

Human – Body consists of several cells with different functions.

A Cell – Unit of body
Cell wall
Cytoplasm
Nucleus

Functions – Secretion
Excretion
Mobility
Conduction
Multiplication

Human body – 6 parts

Upper limbs (extremities) – 2
Lower limbs (extremities) – 2
Trunk – 1 (thorax + abdomen)
Head, neck, face - 1

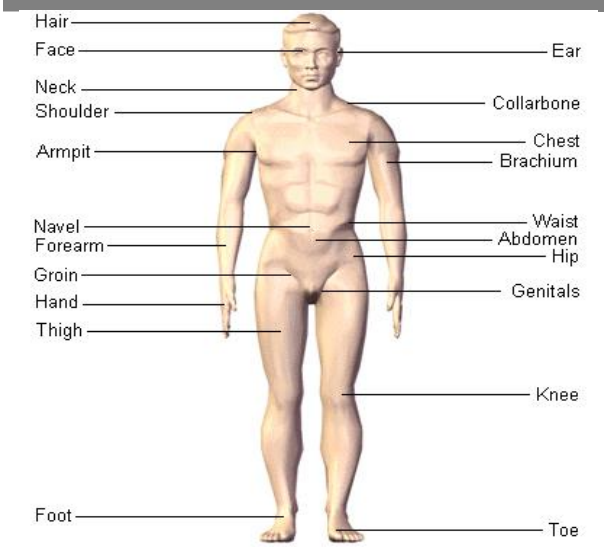
Body directions = Regions
Planes = imaginary lines
Cavities

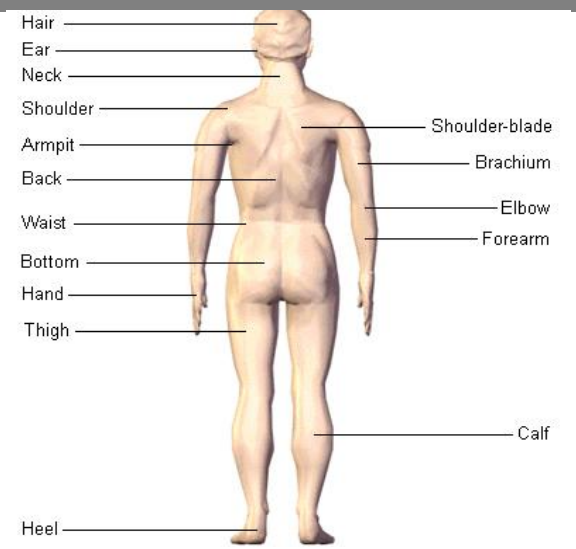
Cavities – Dorsal – Cranial - Brain
spinal – spinal cord
Ventral –
Thoracic – Heart & lungs
Abdominal – Stomach, Intestines, Kidneys, Liver, Gallbladder, Pancreas, Spleen
Pelvic – Urinary bladder, rectum
Organs of reproduction

Body directions = Regions
Superior = above/up, hyper, supra, cranial
Inferior = below/down, hypo, sub, caudal
Ventral = anterior, front
Dorsal = posterior, back, retro
Medial = near the midline, proximal
Lateral = away from midline, distal

Planes (dividing lines)
Midsagittal (Median) – R&L side
Coronal (frontal) – Front & back side
Transverse (horizontal) – Upper & lower parts

Cells
Tissues
Organs
Systems
Body





Tissue
Epithelium / endothelium (different shapes)
Connective – Blood, Bone
Muscular
Nervous
All systems same in males & females except reproductive.

Loco-motor System
Bones / Muscles / Joints

Systems
Skeletal = Bony
Muscular
Digestive
Respiratory
Circulatory & lymphatic
Excretory
Nervous
Glandular
Reproductive

Co-ordinator - Brain

Functions of Bones
Support
Protection
Attachment to muscles
Movements
Blood formation
Storage of Ca+ & P+

Classification of Bones
Long
Short
Flat
Irregular

Muscles Functions
Movements
Body position
Heat production (Glucose)

Fatigue – lactic acid

Classification of muscles
Skeletal, striated, voluntary
Cardiac, striated, involuntary
Smooth, non-striated, involuntary

Tendons / Ligaments / Cartilage

Division of skeletal system
Axial – 80 bones
Appendicular – 126 bones

Joints' Types
– Immovable
– Movable - Gliding
Hinge
Pivot
Ball & socket

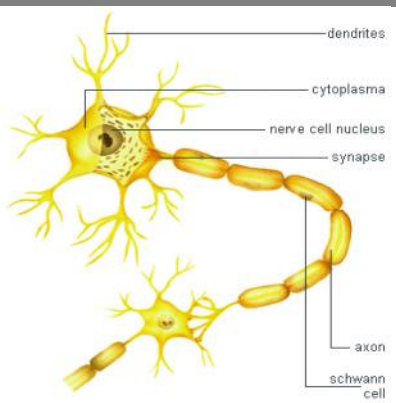
Rickets / Arthritis / Fracture
Osteoporosis / Osteomyelitis / Osteomalacia
Calcium & Vitamin-D

Movements at Movable Joints

Flexion = bending
Extension = straitening
Abduction = away from midline
Adduction = towards midline
Circumduction = Combination
Pronation = palm downwards
Supination = palm upwards
Inversion = sole inwards
Eversion = sole downwards
Dorsiflexion = foot upwards
Plantarflexion = foot downwards

Nervous System
System of nerve cells linked together to receive stimuli & respond to them.

Nerve Cell
Cell body
Dendrites – short processes (branches)
Nucleus
Nerve fibre – axon (long, single)
Sheath = covering



Neuron is the unit
Unipolar
Bipolar
Multipolar

No cell division

Nerve impulse = Electro-Chemical
(Acetyl - Choline, adrenaline)
Synapse - junction
Sensory = afferent
Motor = efferent
Myelinated / Non-myelinated

Divisions of Nervous System

Central – brain, spinal cord
Peripheral – cranial (12 pairs)
spinal (31 pairs)
Autonomic – sympathetic
parasympathetic
Brain – 2 hemispheres
Left controls right side
Right controls left side
Protected by 3 coverings & CSF

Every cell in the body needs oxygen & glucose for activity.

Functions of Brain

To receive all sensations
To control muscular actions
To remember all episodes
To read, write & speak
To maintain body balance, posture, equilibrium
To regulate heart beats, respiratory actions

Spinal Cord

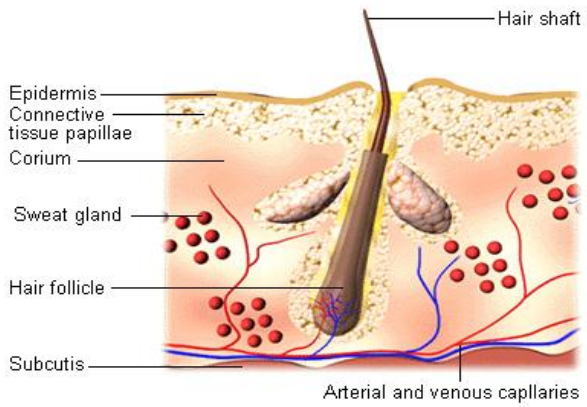
Protected by vertebrae
Conveys nerve impulses both ways to the brain and from the brain.
Brain cells die if there is no oxygen for more than 4 minutes.

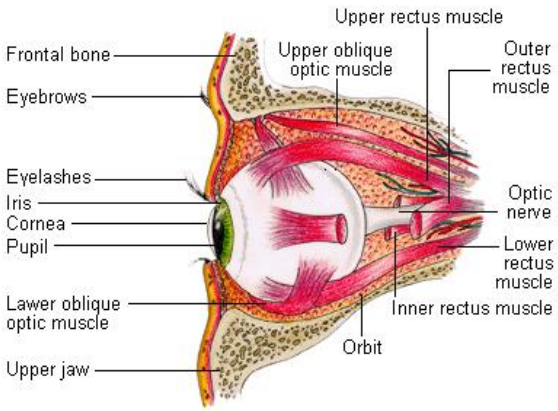
Skin – sense organ
Epidermis, Dermis, Hypodermis
Functions – Protection – covering, melanin, acids
Temp. regulation
Excretion
Sensation – pain, touch, temp.
Vitamin D formation
Sweating – psychic, physiological (sensible, insensible)
Sweat – 98% water, 2% solids (urea, uric acid, NaCl)

General Senses through out the body

Pressure – 'P' receptors
Temp. – Heat & cold receptors
Touch – Corpuscles
Pain – Free nerve terminals

Receptors are special nerve fibres





Leprosy affects eyes

Nerve paralysis (5th & 7th cranial)
Infiltration by M.L.
Lepra-reactions
Zygomatic Nerve – Lagophthalmos
Corneal Nerve – Anae. of cornea

Patient with patch on face – VIP

1% atropine eye drops
1% zinc sulphate eye drops
Steroids orally
Goggles, blinking exercise, soft cloth covering

Eye – Organ of sight

Eye ball in orbit
Accessory parts – eyebrows
eyelids
eye lashes
lacrimal glands
Eye ball – 3 coats
Fibrous – Sclera (cornea transparent)
Vascular – choroid
Nervous – retina (rods & cones)
Conjunctiva covering

Optical System

Cornea
Lens – Biconvex
Iris & pupil

Image Formation

Cornea
Pupil
Lens
Retina

Photochemical change (Vit.A)
Optic nerve
Vision centre

Defects of Eyes

Corneal opacity
Cataract
Night blindness
Short sight
Long sight
Epiphora
Conjunctivitis
Iritis

Levels of Prevention

Primary – Vaccines
Secondary – Drugs
Tertiary – Treatment of complication

Pharmacology

Pharmacy
Drug – diagnosis, treatment, prevention of a disease

Drug

Source
Chemistry
Dosage forms
Absorption, metabolism, excretion
Actions / Uses / doses / Side-effects

Sources of drugs

Plants
Animals
Micro-organisms
Minerals
Synthetics

Dosage forms

Mixtures / Linctus
Tablets
Capsule
Injections
Enema

Routes

Oral
Sublingual
Rectal
Respiratory
Parenteral

Parenteral – Inunction
Instillation
Intradermal
Subcutaneous
Intramuscular
Intravenous
Intra-arterial
Intra-cardiac
Intra-thecal

Sites of Drug Action
Local – Antiseptics
Systemic through blood
Reflex – inhalation

Dose = age in yrs / age in yrs+12 x adult dose
O.D. / H.S., B.D., T.D.S. /T.I.D., Q.D.S.
S.O.S.

Precautions while administering
Indication
Expiry date
Dose
Route / Label
Shake well / Restore stopper
Place of storing –away from poisons
away from children
away from direct Sun light

Cooler place preferred

Mode of Action
Physical – Colour, Odour, Taste
Chemical – antacids
Biological – antibiotics

Side effects
Allergy
Damage to liver
Damage to kidneys
Vitamin deficiency

Actions of Drugs
Analgesic
Antacid
Antipyretic
Antiarthritic
Antibiotic
Anti-allergic
Anti-diarrhoeal
Anti-emetic
Antiseptic

Anti-Leprosy Drugs
Hydno-Carpus oil / Chaulmoogra (600 BC to 1948)

D.D.S. 1948 to 1981

R-cin (Rifampicin) Anti-biotic

CLF (Clofazimine) dye

1981 till today = MDT

Advantages
Effective
Easy to administer – Blister pack
Easy to store
Easily available
Free of cost
Side effects less
No Drug Resistance

Breaks chain of transmission

Side Effects of Multi-Drugs
R-cin - 99.99% germs killed
Damages RNA of germs
Remains in body 24 hrs.
Red colour urine
Platelets less
Liver, Kidney damage

Side Effects of Multi-Drugs

CLF - Damages DNA of germs
Remains in body 22 days
Red brownish colour-skin
Sweat less, dry skin
Acute pain in abdomen

Side Effects of Multi-Drugs

DDS - Damages folic acid metabolism of germs
Remains in body 15 days
Anaemia not common
Drug allergy rare

Other drugs in Leprosy

Chloroquin
Zinc-sulphate
Thalidomide
Mag-Sulph
Savlon
Turpentine oil
Betadine

Drug of choice - steroids in Neuritis, lepra-reactions

Side Effects of Steroids

Hyperacidity
Peptic-ulcer (perforation)
Tuberculosis (precipitation)
Diabetes (accentuation)
Weight gain
Oedema – water retention
Exophthalmos
Dose - tapering

Microbiology - study of minute germs

Germs – Bacteria
Viruses
Fungi

Bacteria cause diseases in man.
Two types mainly
Bacillus – rod like
Coccus – ball like
They are transparent in nature.

Colour is given to see them under the microscope.

Staining

Colouring process is called as staining.

Gram's Staining (Positive & Negative)
Zeil – Neelson's Staining (AFB)

M-leprae take up carbol – fuchsine & do not give up the red colour even if acid is poured on the slide. Hence, they are called acid fast bacilli (AFB).

For more magnification oil immersion lens is used. The germs are arranged in clusters or cigar shaped bundles.

Sterilization

Moist heat – Steam under pressure in autoclave.
Hot water – Boiling for 10 minutes
protect cutting edge by gauze.
Dry heat - In oven at 1600C for 2 hrs.

Approach to patient

Sympathetic, Assuring language
History – Name, Age, Sex, Address
Origin, Duration, Progress of lesion.
Treatment if any
Physical Examination – Good light
Presence of another female
Inspection of all body parts
T/P/R
Tongue, Eyes, Nails
Lab Tests, Smear, Biopsy, EMG

2
Peripheral Nerves

Structures and Functions

Nerves in Leprosy – Site and course

Nerves in Leprosy – Risk factors and Damage

Risk for nerve damage – Identification and monitoring

Peripheral Nerves

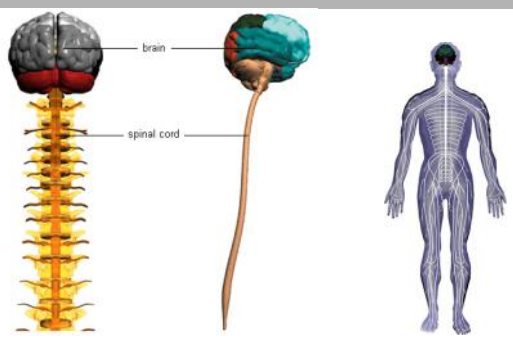
Structures and Functions

Nervous system

- Central Nervous System (Cerebrum)
- Spinal cord (medulla spinalis)
- Peripheral Nervous System (PNS)

Peripheral nerves

- Cranial nerves – in the head area
- Spinal nerves – in the trunk
- Peripheral nerves - in the extremities

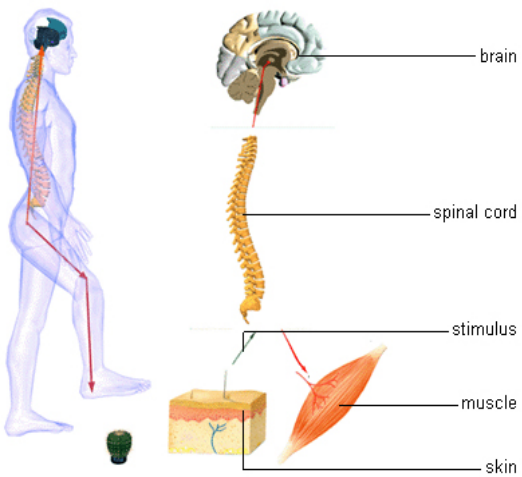


Peripheral Nervous System

- Somatic nervous system - carry impulses from the senses to CNS and impulses from the CNS to muscles.
- Autonomous nervous system - nerve connect all internal organs, smooth muscles, blood vessels and digestive system.

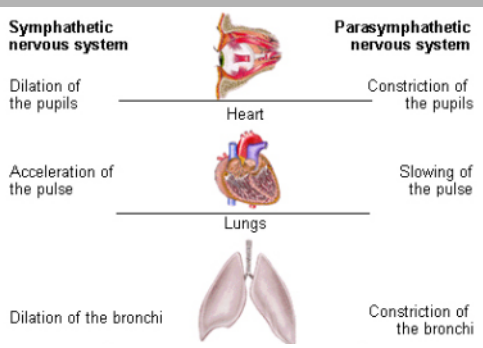
Somatic Nervous System

- Sensory nerves and motor nerves.
- **Sensory nerves**, also known as **<u>afferent</u>** nerves - carry impulses from the periphery to the center.
- **Motor nerves**, also known as **<u>efferent</u>** nerves, carry impulses from the center to the periphery.

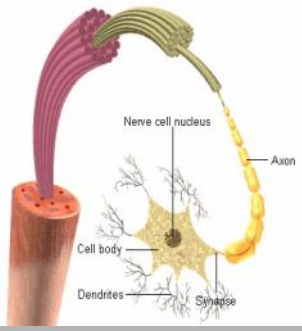


Autonomic Nerves System

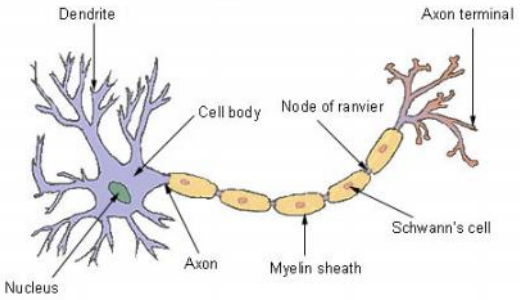
- Parts of the peripheral and central nervous system
- Controls all the body's involuntary function of the organs - lungs, heart, blood vessels, intestine and bladder.
- Divided into two main sections:
  1. Sympathetic nervous system
  2. Parasympathetic nervous system.



Peripheral nerve - Structures



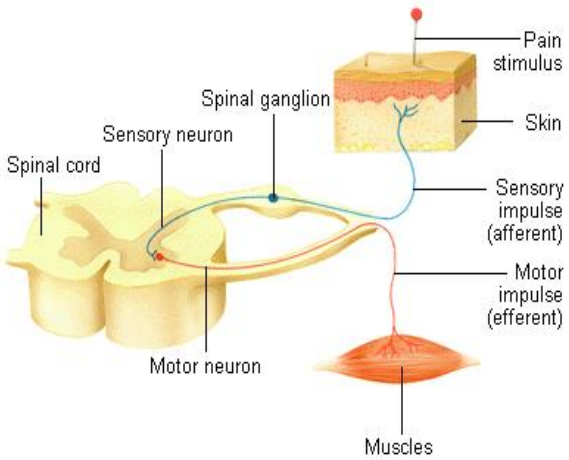
Nerve cell



Tendon Reflex

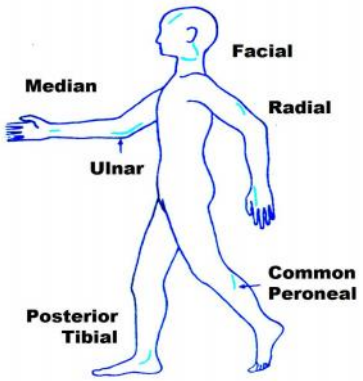
- An involuntary reaction of a muscle to stimulation from outside the body.
- Reflex stimulus is passed directly to the motor pathway in the spinal cord
- Information from the spinal cord is passed straight to the brain.
- Registers incoming information and passes it on to an afferent neuron
- Passes on impulses to the spinal cord and to the muscle via an efferent neuron.

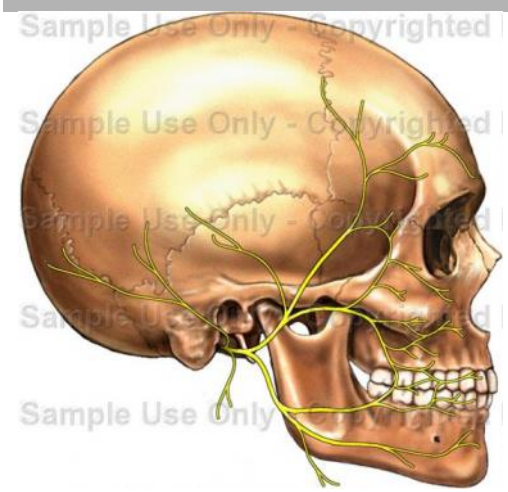
Reflex actions to pain stimulus



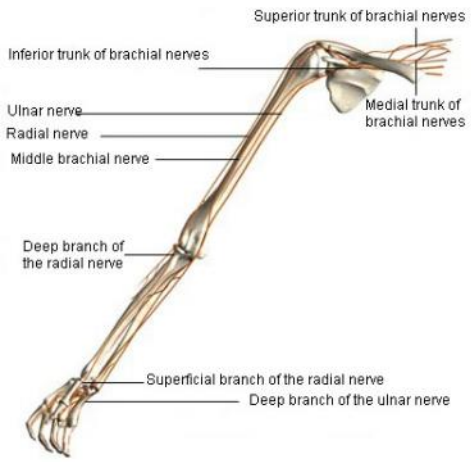
NERVES IN LEPROSY

Site of damage and course

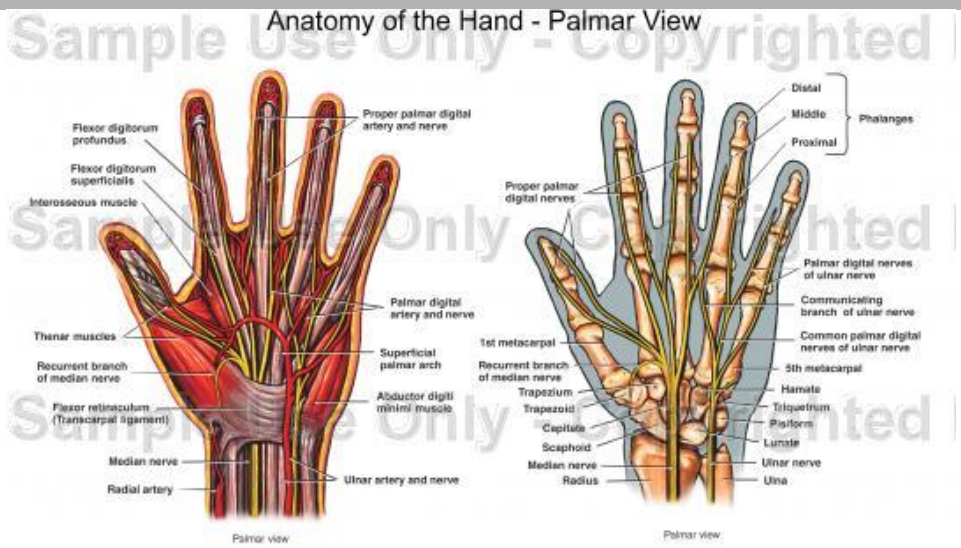


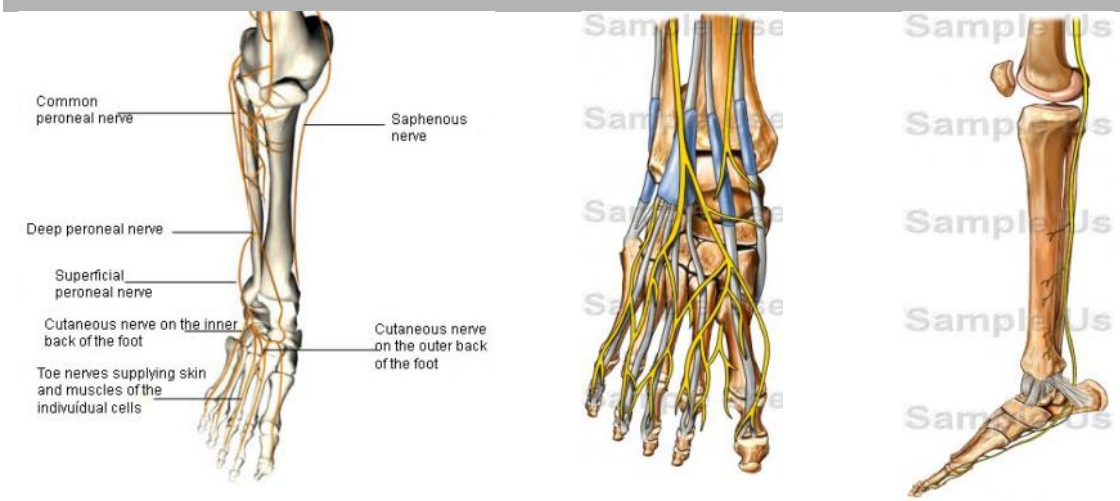


Nerves of the face



Nerves of the upper limb





Nerves of the lower limb

Peripheral Neuropathy - Definition

- Failure to carry information to and from the brain and spinal cord.
- Produces pain, loss of sensation, and inability to control muscles.
- May involve a single nerve or nerve group (mononeuropathy) or affect multiple nerves (polyneuropathy).

Damage to Peripheral nerve

- **Demyelination** – slow conduction in the nerve – reduced frequency
- Possible to restore normal conduction
- **Axonal degeneration** – no active conduction in the nerve.
- Need considerable time to restore normal conduction.

Neuropathy : Causes

- Genetic disorders – Hereditary neuropathy
- Metabolic disorders - Diabetes
- Infection or inflammatory conditions - Leprosy
- Exposure to chemicals – Heavy metals
- Secondary to drugs – Thalidomide & DDS
- Ischemia / Injury – Compression or surgery
- Nutritional deficiency - Alcoholism

Common Symptoms

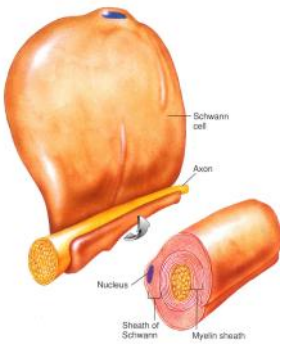
- Tingling and numbness
- Burning sensation
- Shooting pain
- Cramping
- Decreased tendon reflex
- Feels like frostbite or
- Walking on a bed of thorns

NERVES IN LEPROSY

Risk factors and Damage

Entry of M. leprae into nerve

- Only bacteria to enter the nerve cells.
- From the intraneural capillaries into the nerve.
- Infiltrate the perineurium and then the nerve (Schwann cells).
- Naked nerve endings (axons) in the epidermal region.
- Not detected by the immunological mechanism.



Mechanism of nerve damage

Antigen – M.Leprae
⇩
Granulomatous reaction – Fibrosis
⇩
Intraneural oedema – Ischemia
⇩
Destruction of nerve - Paralysis

Nerve damage

- Onset – sudden or insidious
- Depends on the type and the duration of leprosy.
- Risk is intense or acute during 'reactions' that occur at any stage of the disease.

Risk factors for nerve damage

- Patients with multiple lesions (MB)
- Patients with thickened trunk nerves
- Patients with lesion on face.
- Patients with lesion on the trunk nerves.
- Patients with reactions / neuritis.

Precipitating factors

- Disturbance in the immune system.
- Patients with unstable immune response (Lepra Reactions).
- Patients with hormonal changes. (adolescent age & Child bearing age)
- Patients with concomitant diseases

Type I Reaction - Rationale

- Occurrence is episodic nature
- Intensity of reaction differ from one individual to another.
- Intensity is maximum during 1 – 4 weeks and moderate during 2 – 3 months.
- Corticosteroids should be given in sufficient doses for sufficient time.

Type II Reaction - Rationale

- Anti-inflammatory effect of clofazimine takes 6 - 8 weeks.
- Prednisolone takes only a few days to act
- Supplement medication – Vitamins, iron, de-worming and treatment for intercurrent infections (Sedatives, if indicated).

Changes in the nerve

- Thickening of nerves – Chronic inflammation within the nerve – leads to granuloma formation results in fibrosis.
- Thickness of nerve may vary from individual to individual & subjective.
- Tenderness of nerve – Acute inflammation within the nerve – leads to ischemic fibrosis resulting in pain.
- Spontaneously or only on palpation

Acute neuritis

- Inflammation of the nerve with oedema
- Increased vascularity & cellular infiltration
- Acute signs and symptoms of pain or chronic inflammation
- Active destruction of nerve
- Nerve may be paralyzed in 24 hrs accompanied by acute pain and swelling.

Silent neuritis

- Sensory or motor impairment without pain in the nerve (signs of reactions).
- Continued presence of M. leprae and its antigens in Schwann cells.
- Minimal intra-neural edema and advancing reactive fibrosis.
- Affected Schwann cell gradually degenerates, dies and is replaced by fibrous tissue.
- No active symptoms of neuritis.

Pattern of the nerve damage

- May have only nerve thickening or tender, but sensation and muscle strength is normal.
- May have loss of sensation and muscle weakness or paralysis but nerve is normal – as compared to the nerve on other side.
- May have muscle weakness or paralysis without loss of sensation (Except facial nerve).

Nerve functions

- Sensory supply to skin – Loss of sensation (Anaesthesia).
- Motor supply to muscles – Muscle paralysis.
- Autonomous supply to body system – Skin dryness.

Sensory function

- Any abnormality of sensory function
- Loss of thermal, touch, pain and pressure.
- Initially minimal with paraesthesia.
- Do not realise until some severe damage is caused due of lack of pain.

Motor function

- Easily recognised when the paralysis is present.
- Less obvious at early stage.
- To look for early weakness or discomfort.
- Difficulty to perform day-to-day functions as normal.

Autonomic function

- Often unrecognised
- Disturbance in the thermal regulation.
- Skin becomes dry and splits easily.
- Even if the crack seems small and unimportant, it is best to treat early.
- Other contributing factors – metabolic diseases, age and climate conditions.

RISK FOR NERVE DAMAGE

Identification & monitoring

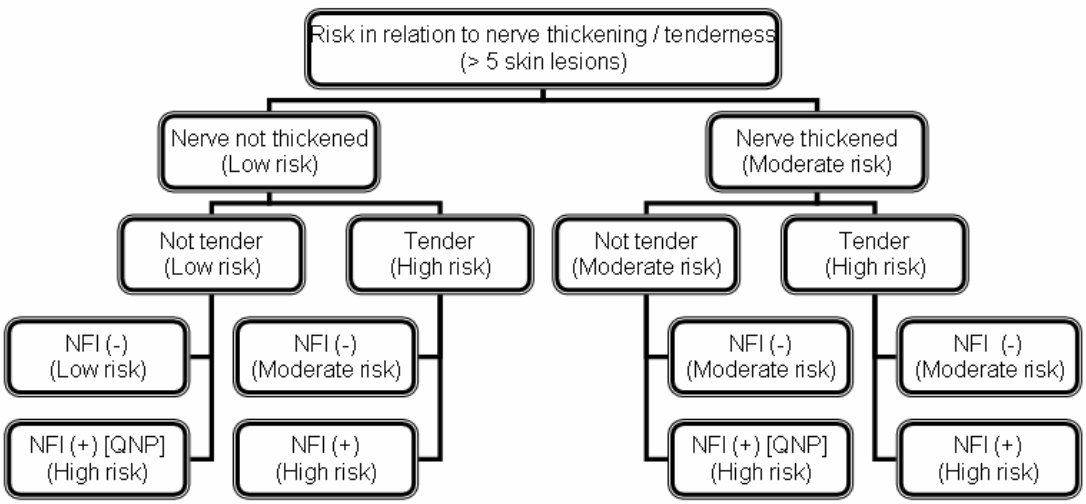
Identifying early nerve damage

- About 60 - 70 % of the nerve fibres are already destroyed, before NFI is clinically deducted.
- In TT, the nerve damage is localized and confined to a single fascicle sparing the rest of the nerve.
- In LL, the nerve damage is generalized and mostly confined to the cutaneous branches of the trunk nerves.

Identifying early nerve damage

- **Low risk** - Nerve function assessment– No active intervention.
- **Moderate risk** – Teach pre-disability signs, Nerve function assessment - treat with steroid, if NFI is present.
- **High risk**- Treat steroids, teach strengthening exercises / splints & self care, periodical nerve function assessment to monitor the change.

Nerves – Flow chart for grading risk status



Electrophysiology Assessment

- Electrophysiological properties of nerves and muscles by stimulation.
- Nerve conduction velocity (NCV) studies are able to detect neuropathy before it is clinically detected - sensitive.
- Electromyography (EMG) - evaluation of muscle function (indirectly nerve root and anterior horn cell) by needle insertion into the muscle.

Nerve palpation

- Locate and feel the nerve with the tip of index and middle finger.
- Move the finger along the course of the nerve – observe the consistency – compare with the other side.
- Apply gentle pressure – do not tickle the nerve – increase the pressure gradually – Observe the face for "pain" expression

Testing Ulnar nerve

Testing Lateral Popliteal nerve

Types of pain sensation

- **Paresthesia:** an abnormal sensation (spontaneous or evoked)
- **Dysesthesia:** an unpleasant sensation (spontaneous or evoked)
- **Allodynia:** Non painful stimulus, but percieved as pain
- **Hyperesthesia:** increased sensitivity to pain stimulation

3
Skin

Structures and Functions

Sensory assessment

Damage and Self care

Causes of sole wounds

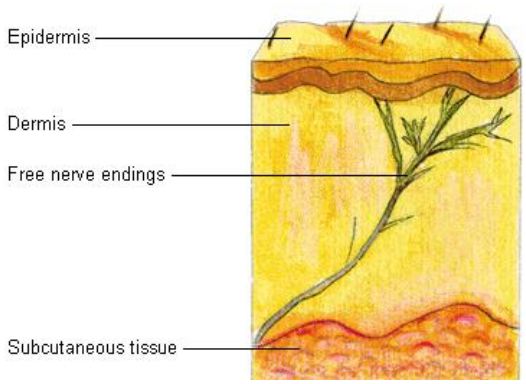
Treatment of plantar ulcers

Plaster cast and Special footwear

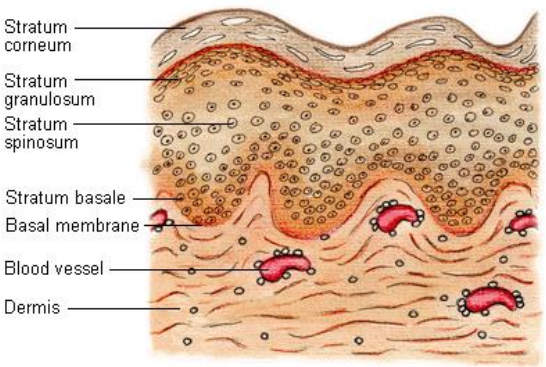
SKIN

Structures & Functions

Parts of Skin



Skin – Layers



Epidermis

- Multi-layer cover tissue divided by furrows.
- Furrows create specific patterns for each individual – Finger print
- Top surface of the epidermis consists of cornified cells, which is constantly replaced.
- Non-vascular epidermis is nourished by the protrusions (papillae) of the Dermis (corium) beneath it.

Dermis

- Protect from mechanical damage and make the skin elastic.
- Upper layer consists connective tissue (collagen fiber and elastic fiber) and small blood vessels (capillaries).
- Contains pigments that provide protection from the ultraviolet rays from the sun.
- Accommodates most of the sensory cells (receptors) of the skin.

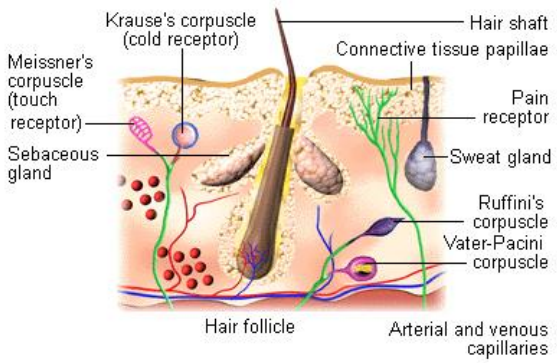
Subcutaneous

- Consists of fatty tissue separated into chambers.
- Connects structures such as periosteum or fasciae and makes it possible to move the skin.
- Gives cushion effect and act as shock absorber
- Blood vessels and nerves run through the subcutis.
- Thickness depends on location of the body.
- Upper layer contain sensory nerves & sweat glands.

Types of sensations

- Wide range of sensations: touch, pressure, vibration, heat, cold and pain.
- Sensations can be localized with great accuracy.
- On average, every 1 cm² of skin has 2 heat, 13 cold, 25 pressure and 200 pain points.
- These numbers differ greatly from the average at different parts of the body.
- To perceive the stimuli, many nerves end in the skin or connected to the receptors.

Types of sensations



Sensation – Thermal

- When body temperature is above normal, increased sweat secretion is induced by receptors.
- Cools the skin surface so the heat can be removed through the skin.
- Temperature decrease when the blood circulation is reduced.
- Also depends on clothing, physical movement and humidity.

Sensation – Pain

- Superficial or deep pain sensation
- Body reacts differently to the two types of pain.
- Superficial pain is felt sharp, following injury to the upper layers of skin - spontaneous pulling away reflex.
- Deep pain is perceived as a dull pain following crush injury or pressure - gradual relieving of the specific area.

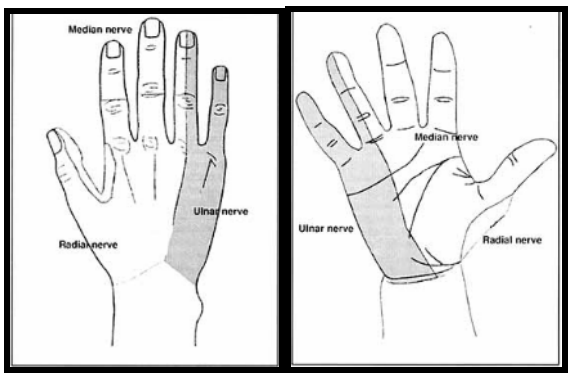
Sensation – Touch

- Ability to feel light touch
- Ability to recognize the 3D aspect of any object (Stereognosis) – Size, shape, weight and texture.
- Get lost when there is loss of thermal sensation as both sensation take same neural path.
- Useful for tactile sensory perception

SKIN

Sensory assessment

Sensory distribution in hand



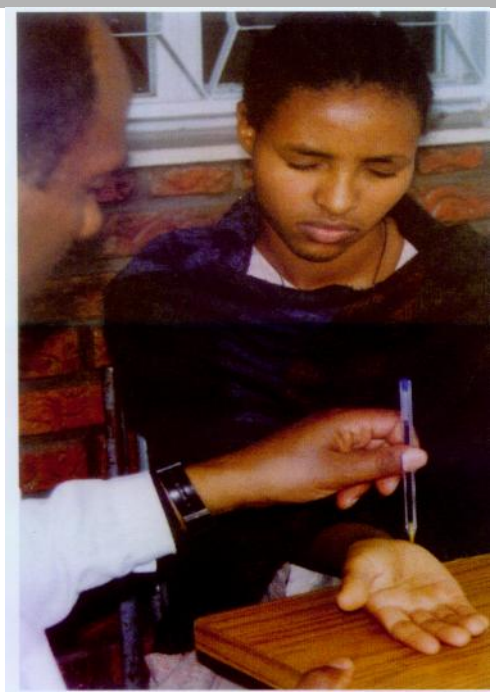
Sensory distribution in foot

Purposes of Sensory Testing

- Assess the extent of sensory loss
- Evaluate & monitor sensory recovery
- Assist in diagnosing disease (PN)
- Provide prognostic information
- Determine impairment & functional limitation.

General Principles

- Comfortable room temperature
- Minimal or no distractions
- Understanding of language
- Give test stimulus randomly
- Establish time limit for response
- Test NORMAL areas before affected
- Note accuracy & speed (Dry / callous)

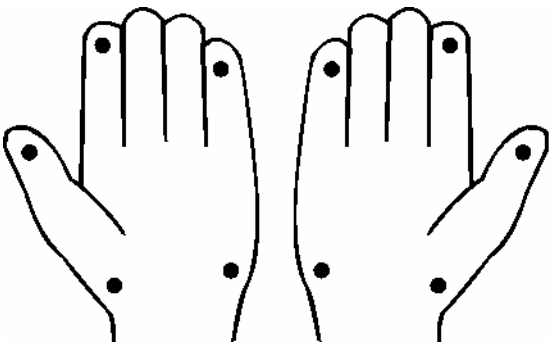


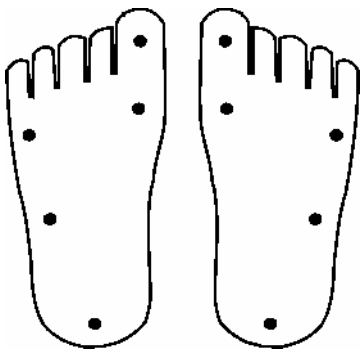
Field Sensory Testing

- Inform the patient about the procedure
- Touch the skin with the tip of ball-point pen
- Keep the patient eyes closed while testing
- Ask the patient to identify the site.
- Repeat the same at different sites.

Limitations

- Skin thickness is not even on the palm and sole surface.
- Dryness / softness and callous / scar can increase / decrease the normal sensory threshold.
- Overlap of sensory distribution by communicating digital nerve branches.
- Difficult to interpret changes in sensory perception.





Monitoring sensory changes

- 5 points each per limb (Total 20 points)
- Mark ✓ for normal sensation
- Mark ‘x’ for sensory loss on the dots.
- Count the ‘x’ and write on the corresponding limbs. (e.g. 5 / 20)

Mononylon Filament

- Green – NORMAL – Patient can recognize light touch & deep pressure
- Blue – Diminished light touch
- Purple – Diminished protective sensation
- Red – Loss of protective sensation
- Red Orange – Loss of all sensation except deep pressure

SKIN

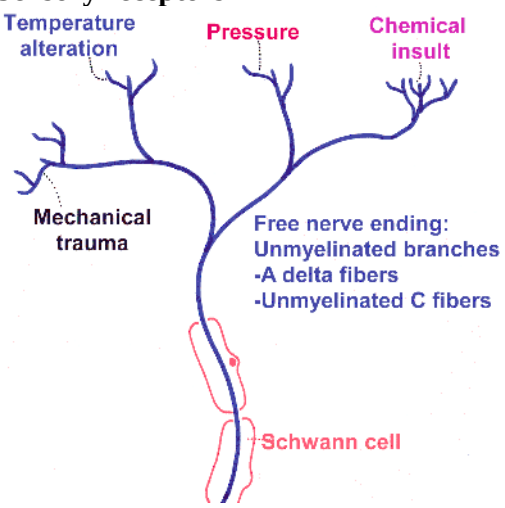
Damage & Self care

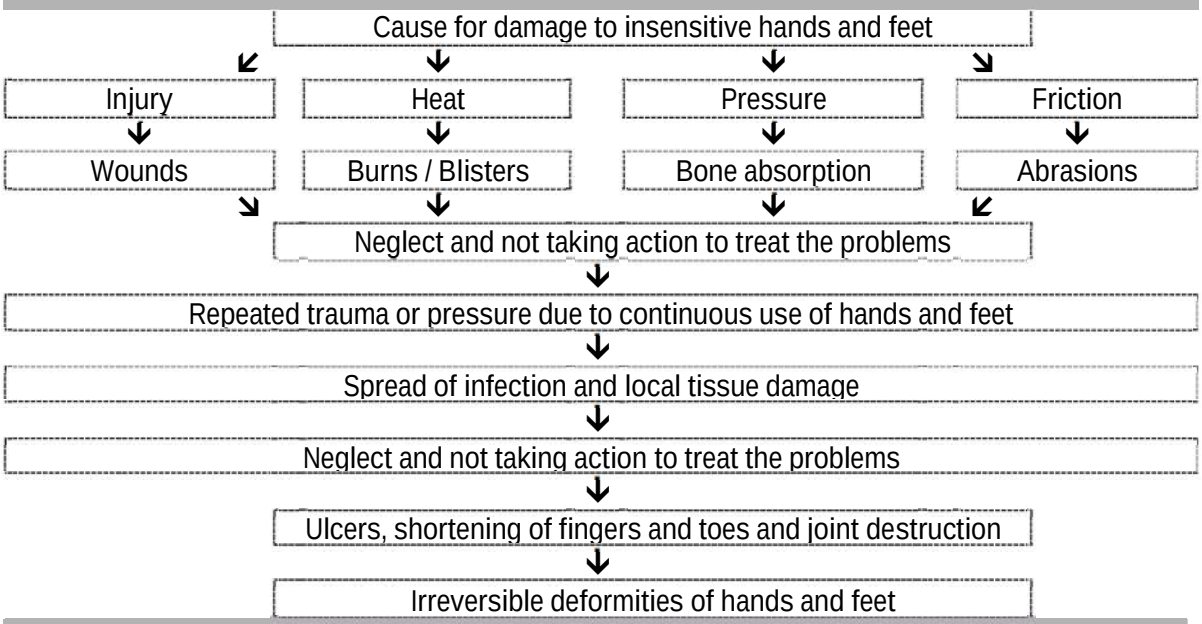
Sensory damage to limbs

Damage to skin

- Injury – blunt or sharp cut.
- Heat – contact with hot objects.
- Pressure – holding rough objects.
- Friction – Sheer force during manipulation.

Sensory receptors





Damage to skin - Injury

- Due to any mechanical trauma – crush / laceration / cut.
- Skin diseases – eczema / Psoriasis / Diabetes / malignancy.
- Skin dryness - cracks / fissures
- Usually affects the upper layer of dermis and sometimes deeper tissue.

Damage to skin - Heat

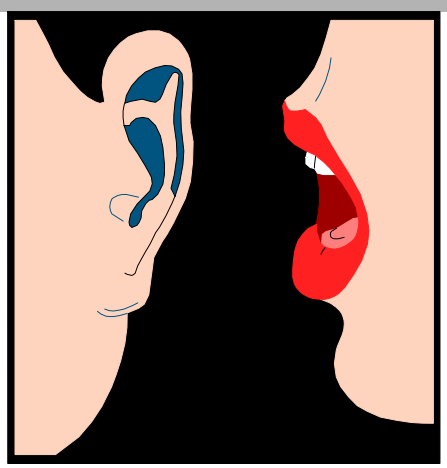
- Excessive localized heat cause blister
- Usually affect the upper skin layer (Epidermis) and the red layer beneath (Dermis).
- Connection between dermis and epidermis is destroyed in burn blisters.
- Deeper tissues will get affected if the intensity of heat is very high.
- Loss of tissue fluid.

Damage to skin - Pressure

- Form callosities in certain areas of skin subjected to heavy load or pressure.
- Skin on the hands and feet is commonly affected – bed sore, occupation related.
- Sustained pressure on a small area for a longer time – Diamond cutting, Wood polishing.
- Deeper tissues will also get affected, if the pressure is localized.

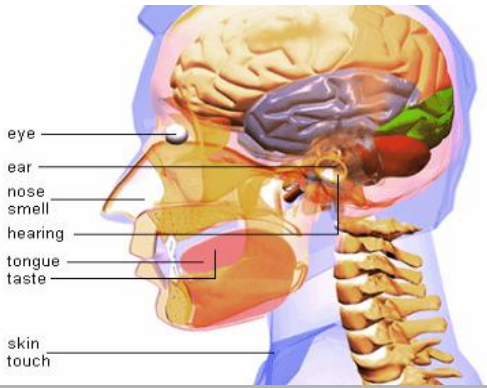
Damage to skin - Friction

- Repeated abrasions or friction between the skin and bone cause tissue rupture between the layers of the skin – resulting in internal bleeding.
- Sheering force in the skin against any rough or hard surface of tools and instruments – Drawing water from well, walking on a sloppy surface / climbing a mountain.

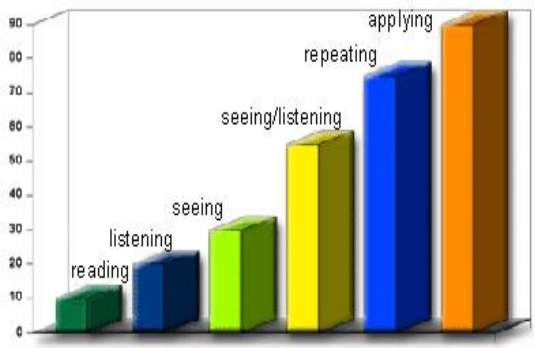


Teach the patient to protect their insensitive hands and feet

Senses



Memory Effects



Treatment for dry skin & cracks

- Soak the hand in water for 15 – 20 minutes.
- Rub out the hard skin with a cloth or brush or rubbing the palm against other.
- Never try to cut or pull off the hard skin, only scrape it off gradually.
- Apply oil and rub it well to make the skin smooth.
- Fix soft material (cloth or rubber) on the handle of the tool or instruments**.**

Treatment for burns & blisters

- Teach simple first aid techniques.
- Clean wound with anti-septic solution
- Provide dressing with sticking plaster, anti-biotic or medication and a supportive splint.
- If there is skin pallor, edema or redness - advice rest with splints.
- If there is severe infection with pus discharge, refer the patient to the nearest specialized centre.

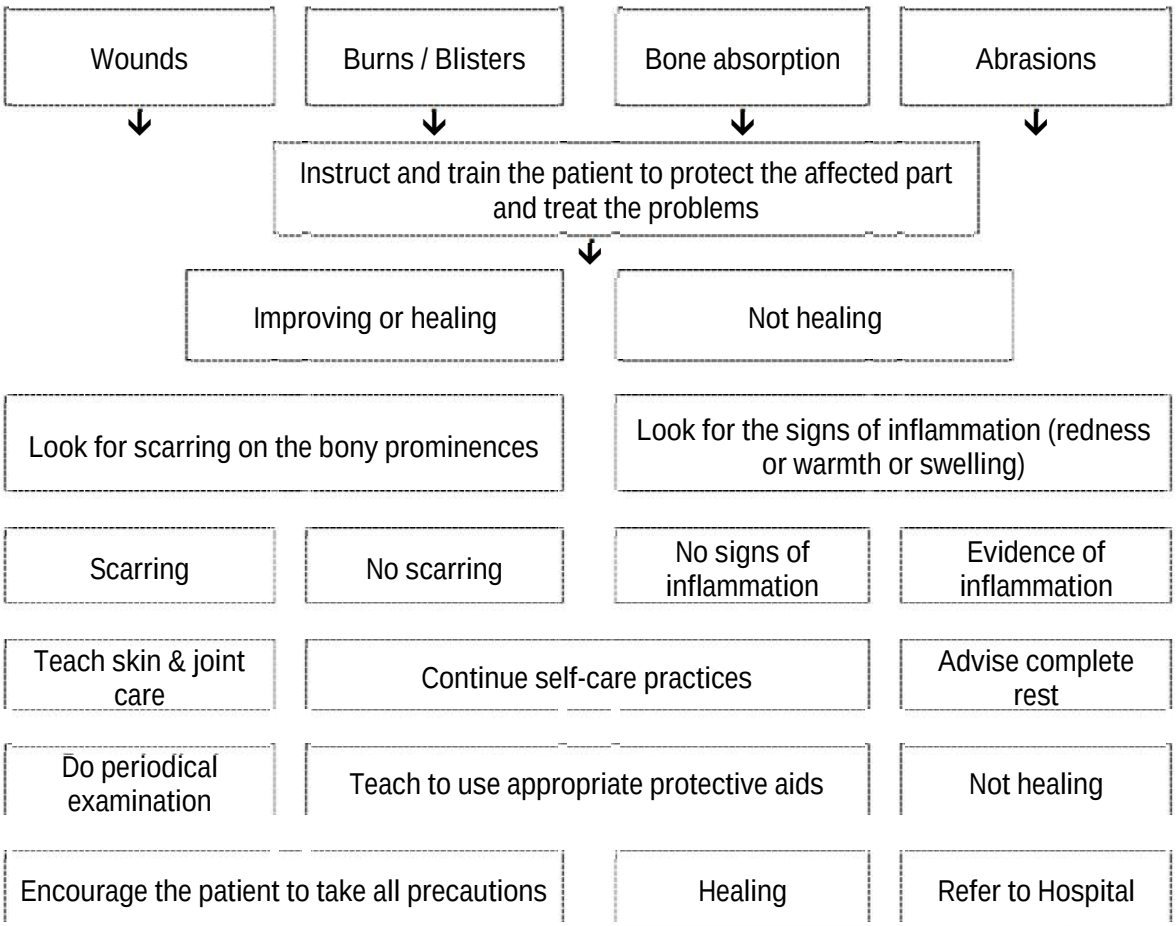
Treatment for swelling

- Keep the affected part elevated above the heart level, preferably with a sling.
- Encourage slight active movements of the joints to prevent joint stiffness.
- Treat the infection with anti-inflammatory medications, if any.
- Compare with the normal hand or foot.
- Provide elastic bandages.

H.O.P.E

- Hydro-Oleo-Physio-Exercises (HOPE)
- Soak in water for 20 min.
- Rub / scrape the calloused skin
- Massage hands and feet with vegetable oil for 10 min.
- Exercises to keep the joints free and mobile

Methods to prevent the damage to insensitive hands and feet



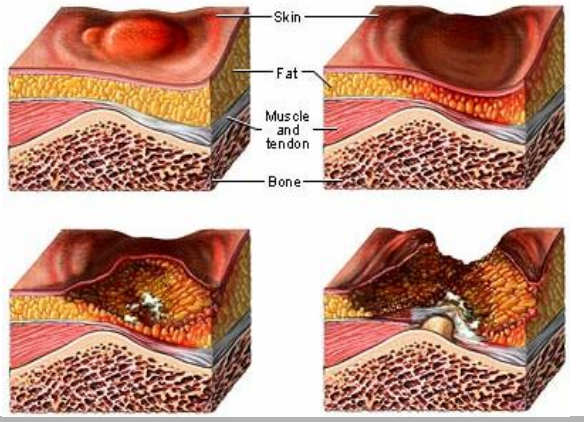
SKIN

Causes of sole wounds

External causes are direct injuries due to the Pre-disposing factors • Thorn / nail prick • Injury / trauma • Callous / bump • Improper shoe or Shoe bite - friction • Rat bite	**Internal causes are due to the physiological process** • Altered and abnormal pressure • Repetitive pressure for long time • Repeated stress due to shear force • Reduced weight bearing area • Inflammation and Ischemic necrosis
Mechanism of ulcer formation • Large amount of pressure in a short time – mechanical trauma (sharp objects) • Moderate pressure that is repeated over a longer time – repetitive pressure (Callous) • Small amount of pressure over a long time – blanching due to pressure (Tight shoe)	**Causes – Abnormal pressure** Low pressure → Ischemic necrosis Continuous pressure → Ischemic necrosis Moderate pressure → Inflammation & sepsis High pressure → Mechanical destruction
Predisposing factors • Deformities of the foot. • Scars of healed plantar ulcers. • Calluses and fissures. • Walking barefoot. • Abnormal footwear – High heels • Excessive body weight.	**Precipitating Factors** • *Sustained pressure: W*eight borne by a small area of foot during walking. • *Friction:* Rubbing between the skin of the foot and rough surface. • *Heat:* hot bath or walking barefoot for too long

Recognize pre-ulcerative stage

- Daily inspection by the patient – to find any break in the skin or red spot or swelling.
- Feel over the bony prominence – to find warmth or pain or swelling around the joints.
- Observe the footwear for pressure points – to find the sensitive area due to excessive walking or running or pressure.



Wounds - Classification

- Diabetic ulcers
- Neuropathic ulcers
- Post surgical wounds
- Trauma / burns
- Pressure wounds

Complications

- infection
- increase in edema
- rough handling / dressing
- re-inflamed tissues
- increase scar production

Wound - Types

- Simple – Superficial, Base with healthy granulation tissue, 3 to 5 cms deep, Minimal infection with pus discharge, No bone and joint involvement.
- Complicated – Deep (> 5 cms), Base not seen, Excessive discharge, damage to bone, muscles and joints, sinus, maggots may be present.

Wound assessment

- Length x Width x Depth
- Tunneling
- Drainage & Odor
- Color of the wound bed
- Nails
- Callous or signs of an infection
- Patient's footwear and hosiery

Instructions to patient

- Your ability to recognize excessive pressure beneath the foot will be diminished.
- You may apply continuous pressure at one site while standing as your foot muscles are paralysed.
- You may allow injuries to remain unnoticed and untreated for a long period as you lost normal warning sense of pain.
- You must guard against injury and provide the daily care necessary to maintain the health of your feet.
- If your foot became swollen with warmth and redness or painful, it is a sign of infection.
- Immediately, consult the doctor and take antibiotics – either orally or apply locally to control infection.
- Do not walk too much as the infection might spread.
- When there is pain, rest the foot with a splint and stop movement of ankle and toes.
- Keep the foot in elevation during night for 5-7 days and completely protected so the oedema will settle.

SKIN

Simple dressing for treatment of sole wounds

Cause of plantar ulcers:

- Loss of pain sensation
- Paralysis of foot muscles
- Lack of warning from danger
- Mechanical factors

Types of ulcers:

Simple ulcer: Any wound which is 2 to 3 cms in size and about 1 to 2 cms deep with granulation tissues seen on the base. Mild discharge may be present.

Complicated ulcer: Any wound which is more than 3 cms in size with deep sinus - base cannot be seen visibly. Severe discharge and foul smell will be present. Rarely, bone involvement and maggots may be present.

Basic requirements:

Artery / thumb forceps, Small bend scissor, Bandage scissor, Scalpel blade (No. 15) with handle, Cotton roll, Gauze piece, Gauze bandage, Autoclave, stainless steel bowl, Kidney tray, Wooden foot stand, stool, sticking plaster.

Medicines:

- Savlon or Detol (anti-septic solution)
- Hydrogen per oxide or Sodium Hypoclorite solution
- Antiseptic / antobiotic cream
- Boric Acid powder or Sulphanamide powder
- Zinc paste or Magnesium Sulphate powder

Treatment of ulcers:

Most ulcers will heal with simple dressing. Application of plaster cast and surgery also heals the ulcers rapidly.

Cleaning and trimming

- Clean the wound first over the ulcer and then around the ulcer with the sterile gauze piece / cotton ball.
- Remove the dead tissue around the ulcer with the help of a scalpel blade. There should be **no bleeding.**
- Use thumb / artery forceps to remove the dead tissue.
- Wash the ulcer with hydrogen-per-oxide solution, if there is discharge or pus.

Applying healing agent

Choose suitable healing agent depend on the type of the ulcer.

Apply the medicine over a piece of gauze.

Remember many wounds heal even without any medicine.

For simple ulcer, apply any antibiotic cream or tape; for complicated ulcer, apply Magnesium sulphate; and for deep and complicated ulcer, apply Sodium Hypoclorite solution.

Covering the ulcer

- Fix the gauze cloth with medicine on the ulcer.
- Apply a few layers of gauze piece or cotton, if there is pus discharge (infection).
- Secure the dressing with a piece of water proof sticking plaster / tape or with a roll of gauze bandage.
- If there is pus discharge, give oral antibiotics.

Instructions to patient:

- Do take rest, if possible or minimize walking and do not wet the dressing.
- Do soaking of the ulcerated foot in clean water for 10 minutes and rub off the scar tissues before dressing.
- Do dressing every alternate days, except when there is too much discharge or foul smell. If develop swelling, keep the foot in elevation at night.
- Do report if the ulcer does not heal within 6 to 8 weeks.

SKIN

Plaster Cast and Special Footwear

Types of Plaster cast

- **Mini POP cast** – Forefoot ulcer with intact sensation on heel – 3 to 4 weeks.
- **Moulded Boot POP cast** – Forefoot and midfoot ulcer – 4 weeks – Partial Non-weight bearing - Need walking support
- **Below-Knee POP cast** – Heel or multiple ulcer – 6 weeks – Total non-weight bearing - Need walking support

Contraindications

1. Active or acute infection
2. Ulcer depth greater than ulcer width
3. Very fragile skin
4. Excessive foot or leg oedema
5. Patients prone to falls
6. Ischaemic ulcers

Biological dressings

- Hydrocolloid
- Hydrogel
- Foam
- Calcium alginate
- Collagen
- Topical powered

Advantages

1. Reduces healing time
2. Allows ambulation
3. Reduces plantar pressures
4. Protects foot from further trauma
5. Does not require as regular changing as other modalities

Disadvantages

1. Cannot be removed by patient
2. Unable to visually assess for infection or ulcer progress until it is removed
3. Slight reduction in ankle joint dorsiflexion ROM
4. Possible skin abrasion
5. Moist environment – fungal infection

Dressing

Covering

Padding

Contact cast

Strengthening cast

Removing cast

Patient instructions

1. Walk as little as possible
2. Be careful on uneven or slippery ground
3. Use a walking stick to improve balance
4. Try to keep the cast dry
5. Notify if any smell, discharge or increased temperature noticed

Guidelines

- Duration of plaster cast depend on the size of the ulcer.
- If doubt about infection, make a ‘window’ in the plaster cast for drainage and dressing.
- If required, admit the patient for a week and immobilize the foot.

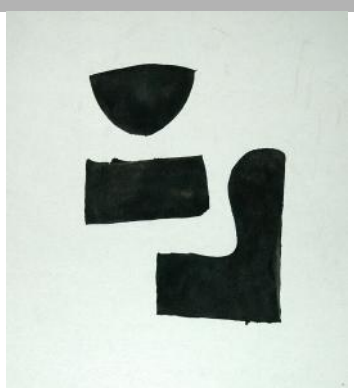
Protective footwear

Moulded insole

Moulded shoes

Foot drop spring

Malleoli cap



Podiatry orthoses

4
Muscles

Structures and Functions
Damage and consequences
Electrical Muscle Stimulation

MUSCLES

Structures & Functions

Types of Muscles

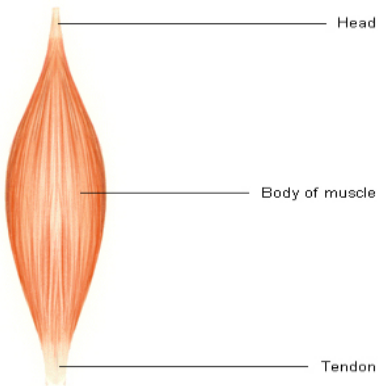
- Smooth muscles
- Skeletal muscles
- Cardiac muscles

Components of muscle

- Contractile element - Belly
- Elastic element – Tendon

Locomotion is possible by the contraction and relaxation of the muscles acting on joints

Parts of skeletal muscle



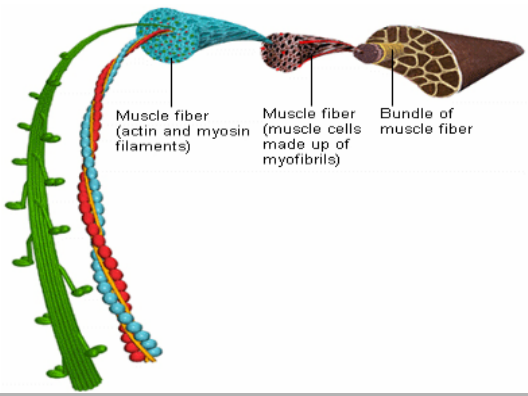
Contractile element

- Muscle fiber – Myofibril
- Sacromeres – Interlinking Actin (thin) & Myosin (thick) filaments
- Overlap between Actin & Myosin produce maximum contraction

Elastic element

- Series – allow sacromeres to shorten
- Parallel – stretches when muscle contract

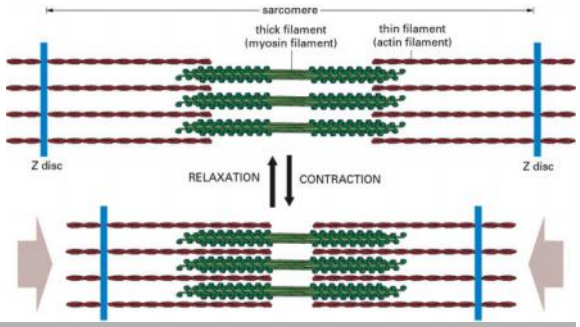
Muscle fiber - Structure



Physical properties

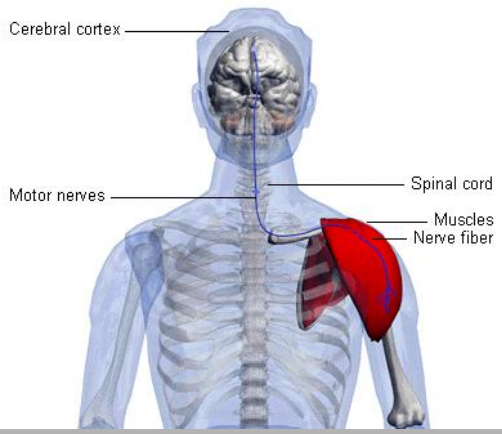
- Contractile - Active contraction combined with passive recoil - ability to return to resting position
- Elastic - Controls elasticity of opposing muscle – offers passive resistance to agonists

Muscle contraction



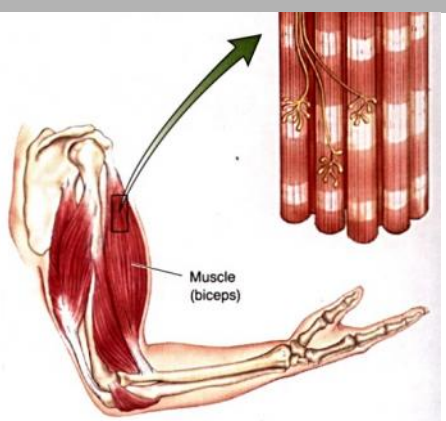
Functions of muscles

- Stability
- Mobility
- Adaptability
- Function in unison or independently



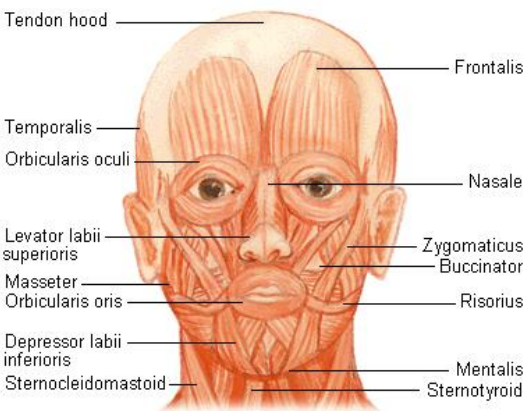
Muscle - Functions

- Muscle work in unison during a movement is called synergists.
- Muscle work against each other is called antagonists.
- Synergists and antagonists must cooperate correctly for making specific movements.
- Depend on the movement, combination of synergists and antagonists changes.



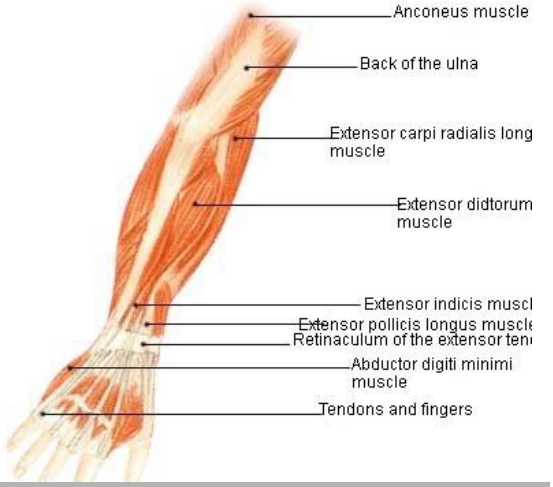
Muscle groups – Face / Eyes

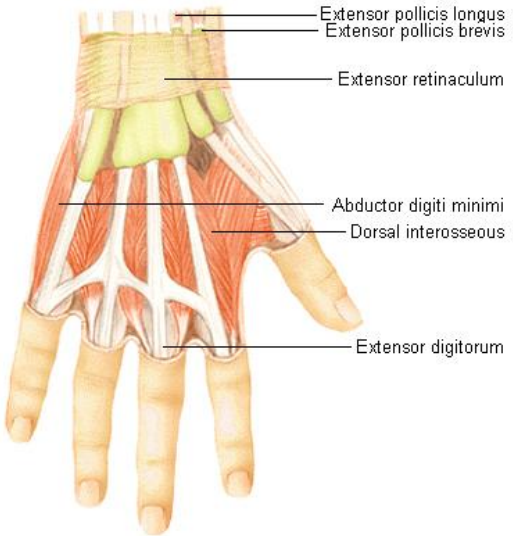
- Orbicularis Occuli
- Orbicularis Oris
- Buccinator
- Zygomaticus

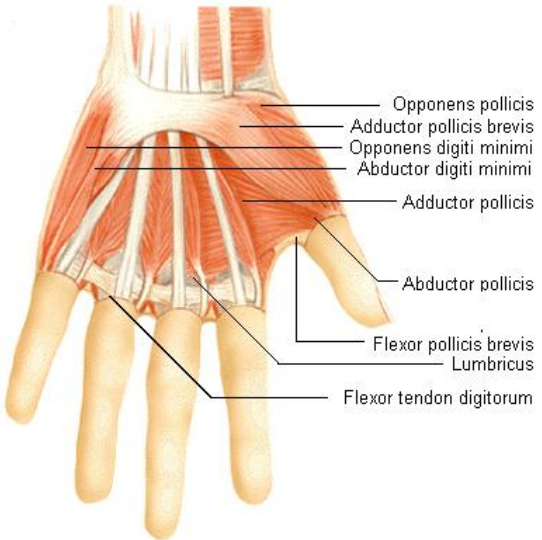


Muscle groups - Hands

- **ULNAR** - Hypothenar (3); Lumbricals (3 + 4); Interosseous [Dorsal (4) + Palmar(3)]
- **MEDIAN** - Thenar (3); Lumbricals (1 + 2)
- **RADIAL** – Finger & Wrist Extensors; Thumb extensors; Pronators and Supinators.

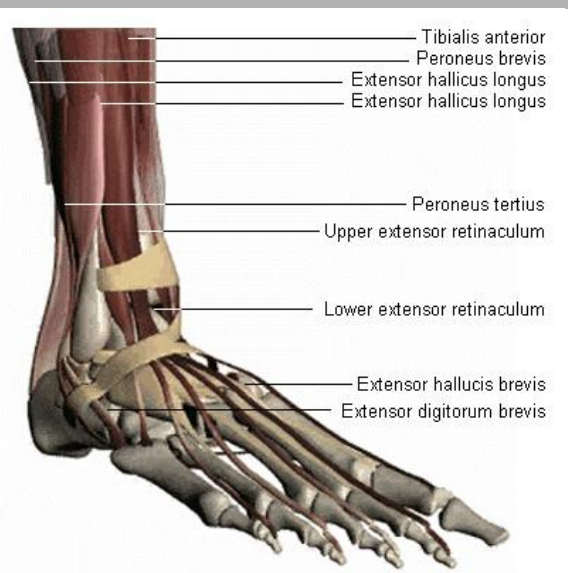


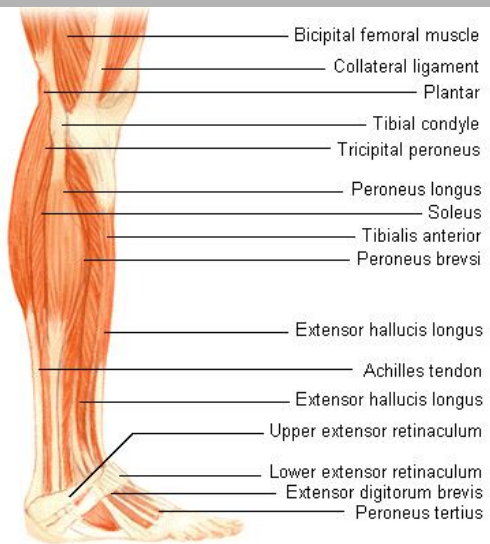


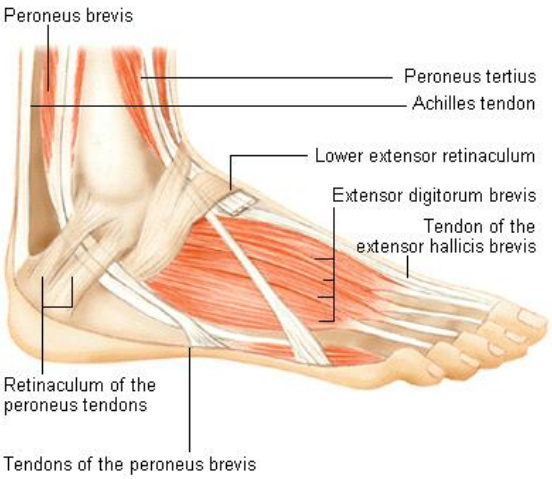


Muscle groups - Foot

- **LATERAL POPLITEAL** – Foot & toe Extensors (3), Evertors & Invertors.
- **POSTERIOR TIBIAL** – Difficult to stimulate as the sole skin give too much resistance to current.



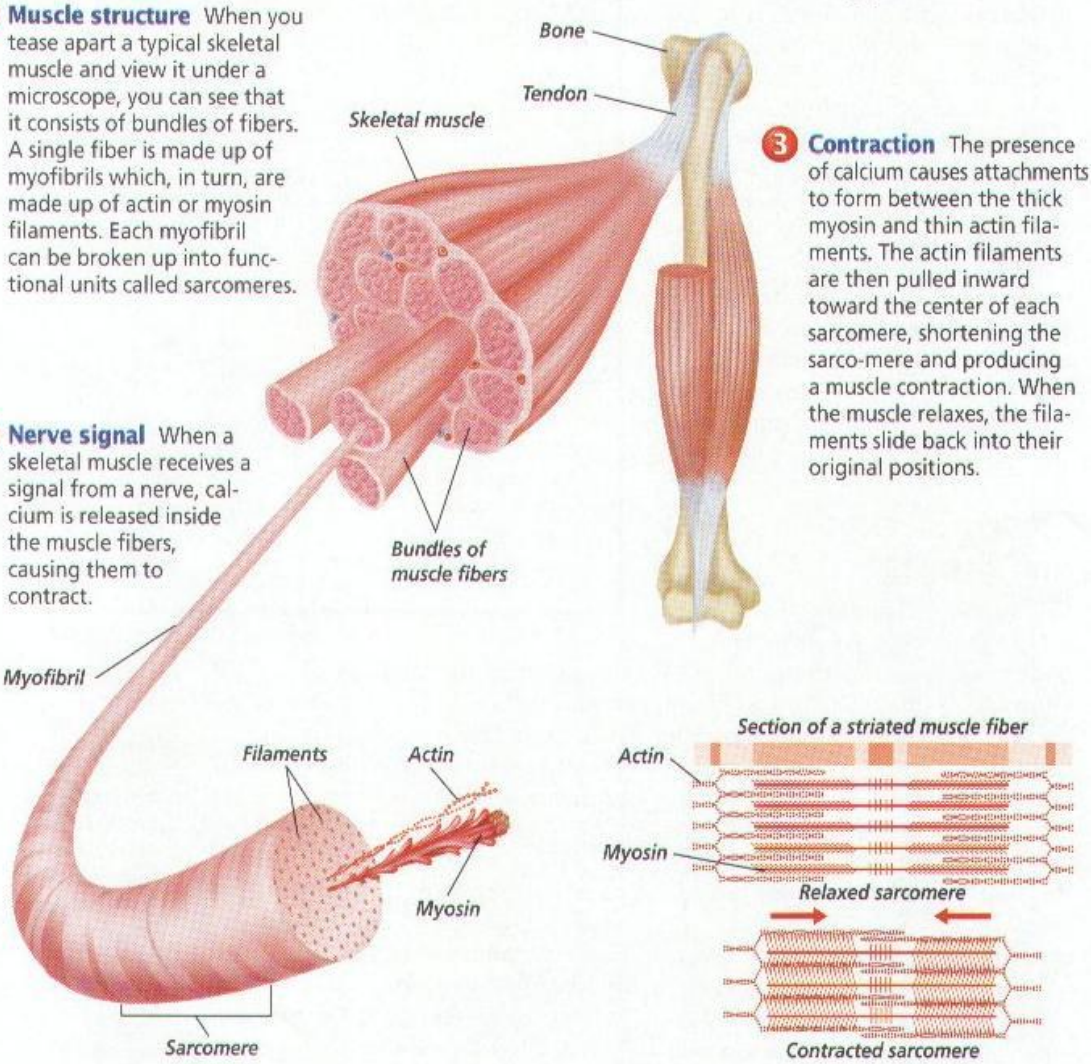




1 Muscle structure When you tease apart a typical skeletal muscle and view it under a microscope, you can see that it consists of bundles of fibers. A single fiber is made up of myofibrils which, in turn, are made up of actin or myosin filaments. Each myofibril can be broken up into functional units called sarcomeres.

2 Nerve signal When a skeletal muscle receives a signal from a nerve, calcium is released inside the muscle fibers, causing them to contract.

3 Contraction The presence of calcium causes attachments to form between the thick myosin and thin actin filaments. The actin filaments are then pulled inward toward the center of each sarcomere, shortening the sarco-mere and producing a muscle contraction. When the muscle relaxes, the filaments slide back into their original positions.



MUSCLES

Damage & Consequences

Muscle damage

- When the calcium is not released, the attachment between the myosin and actin filament push outward and cause no contraction.
- Strength of the muscle contraction depends on the strength and frequency of the stimulation.
- Muscle is damaged or paralysed when link between nerve and muscle is interrupted.

Muscle damage

- Muscle weakness, Tendon adhesions & fractures / dislocations

Causes

- overstretching or atrophic changes
- Immobilization or pain
- Lack of mobility – abnormal joint structure.

Muscle damage

- Acute flaccid paralysis – during acute neuritis.
- Progressive muscular dystrophy – during silent neuritis.
- Duration depend on the severity of nerve damage.
- Site and distance of nerve damage.
- Extensive use of the affected part.

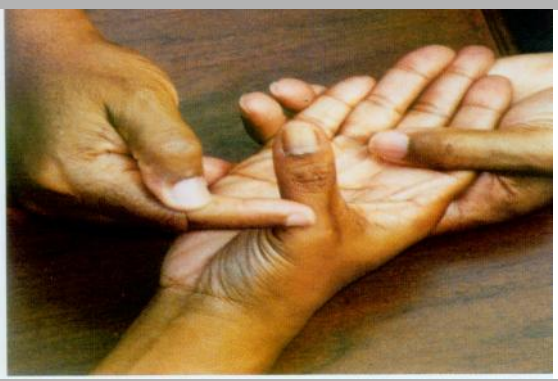
Voluntary Muscle Testing

Testing muscle power – Ulnar

- Hold all the fingers together except the little finger.
- Ask the patient to abduct the little finger.
- Apply resistance on the base of the little finger.

Testing muscle power – Median

- Hold all the fingers together.
- Ask the patient to lift the thumb up (abduct).
- Apply resistance on the base of the thumb.

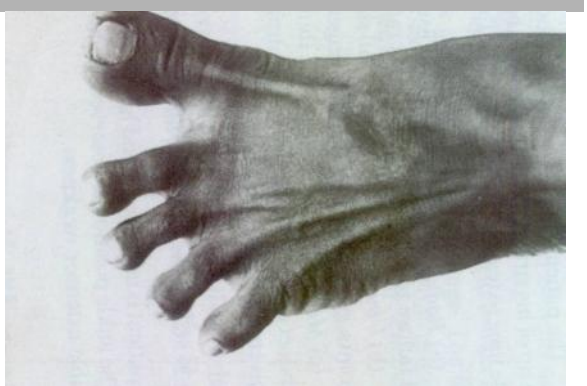


Testing muscle power – Lateral Popliteal

- Hold the leg with one hand.
- Ask the patient to lift the foot up (Dorsi-flexion).
- Apply resistance on the base of the leg.

Testing muscle power – Posterior Tibial

- Ask the patient to spread the toes without lifting or bending
- Apply resistance on the base of the Great and Little toe.

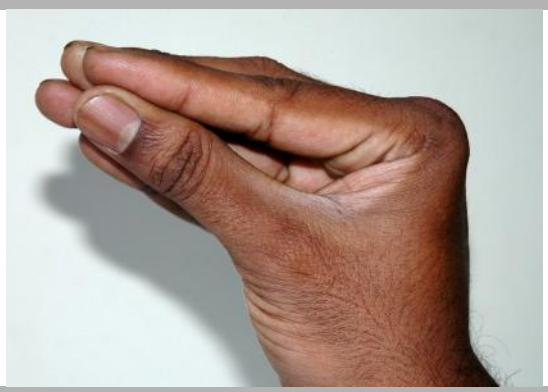


Testing muscle power – Facial (VIIC)

- Ask the patient to close the eyelid tightly.
- Apply resistance on the upper and lower lids and try to open the eyelids.

Simple muscle grading

1. Normal – Full range of movement against full resistance
2. Weak – Full / Partial range of movement against no resistance
3. Paralysis – No movement + muscle atrophy



Simple muscle testing		**Simple eye muscle testing**	
Facial	Close eyelid – Look for gap	Able to keep his eyes closed against resistance	"S"
Ulnar	Little finger out – Push inside		
Median	Thumb up – Push down	Not able to keep his eye closed	"W"
Radial	Wrist up – Push down		
Lat. Popliteal	Foot up – Push down	Gap visible between the upper and lower eyelids	"P"
Post Tibial	Spread toes – No flexion		

MUSCLES

Electrical Muscle Stimulation

Uses:

- Facilitate muscle contraction
- Helps to maintain the tone of denervated muscles
- Re-education of muscle action
- Exercising paralysed muscle
- Improving venous and lymphatic drainage
- Helps to monitor the progress of nerve recovery.

Indications (Low frequency currents)

- **Faradic current:** Used to treat a normal or a weak muscle with good nerve supply. It will elicits a continuous contraction of the muscle during its entire flow of current.
- **Galvanic current:** Used to treat a weak or a denervated muscle with partial nerve supply. It will not elicits continuous contraction of the muscle while flowing steadily, but it will cause a brisk contraction, whenever there is an interruption in a flow of sufficient strength.

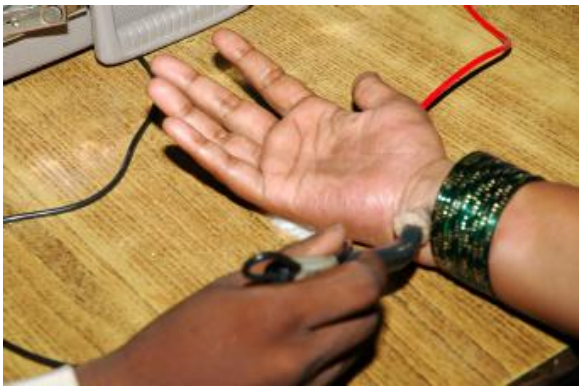
Operational instructions

Preparing the patient

- Inform the patient that electrical treatment do not hurt and do not burn the skin.
- Patients should be placed in a comfortable position during the entire treatment.
- Inspect the part to be treated to make sure that the skin looks and feels normal.
- Special precaution is necessary in case of anaesthetic skin or recent scar tissue.

Setting the apparatus

- Choose proper type and size of electrodes and cover with a piece of linen or gauze cloth
- Moisten the electrodes with warm or salt water to overcome the skin resistance.
- Place one electrode at the nerve point and the other at the motor point and secure with gauze bandage.
- Ensure that the electrodes and conducting cords or cables stay secure during treatment.



Starting the treatment

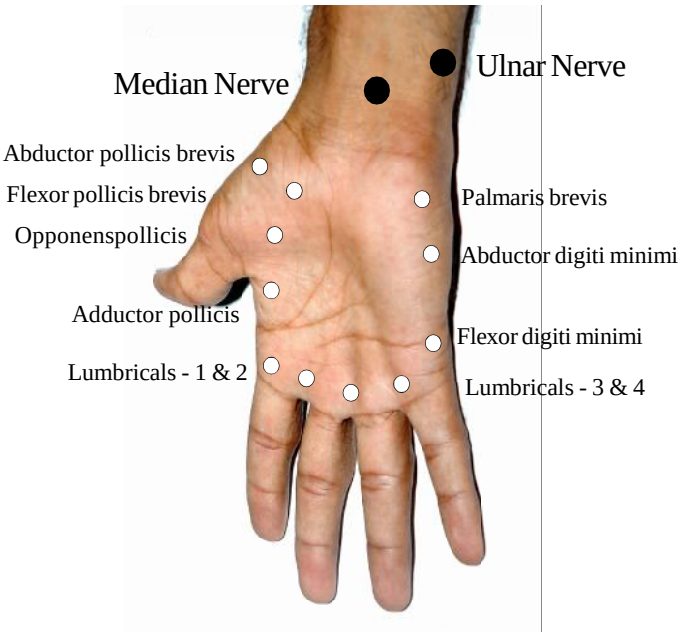
- Turn the main supply and select the appropriate current and the frequency. Choose the pulse duration
- Regulate the current strength from optimal level and increase gradually till the muscle contraction is visible.
- Apply stimulus of each muscle or a group of muscles and allow 30 contractions.
- Do not rapidly change the location of electrode.

Taking precautions

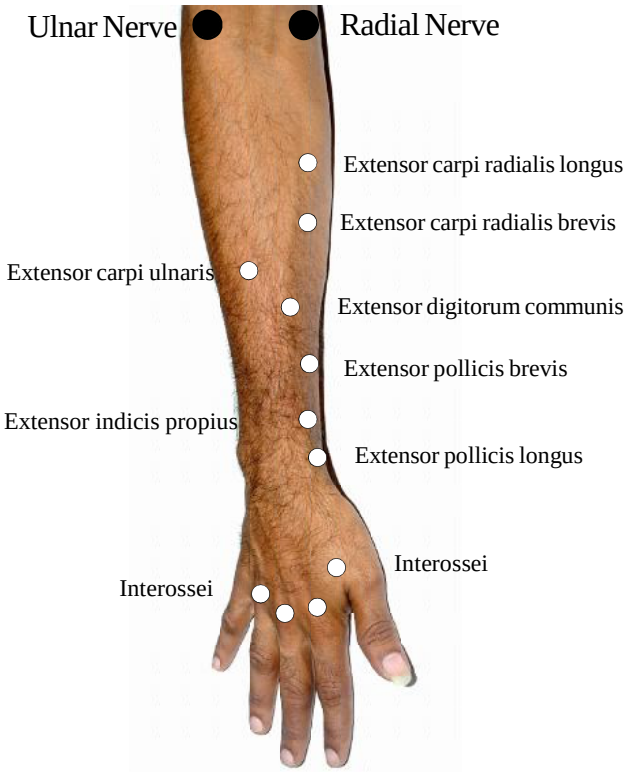
- If the patient complains of unpleasant burning sensation, shut off the current, take off the electrodes, remoisten and then reapply carefully.
- Never push up current strength all of a sudden as it may lead to electric burn or shock.
- Turn off all the controls slowly in the reverse order as it is turned on after completing the treatment.

Nerve and Motor Points

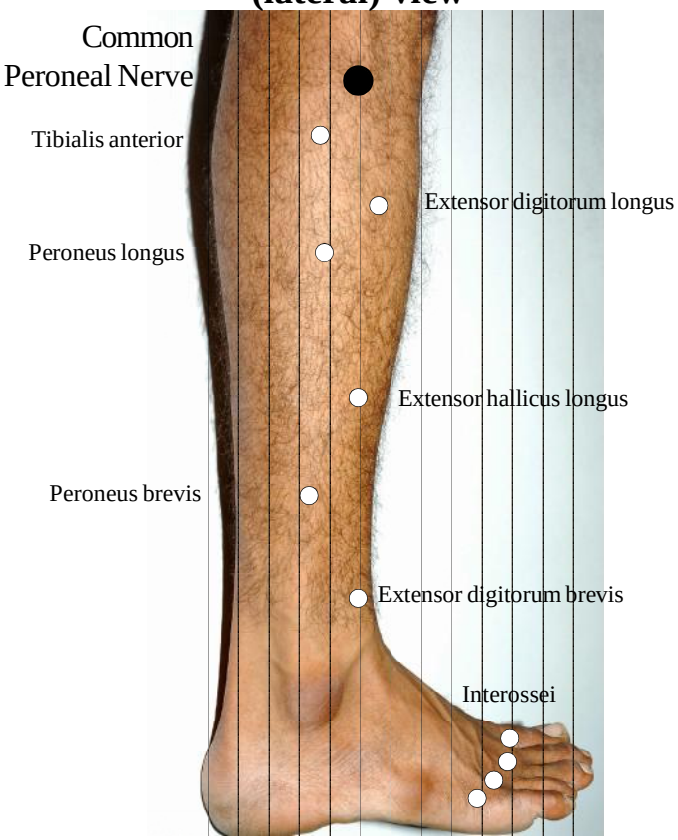
Muscles of hand - front (anterior) view



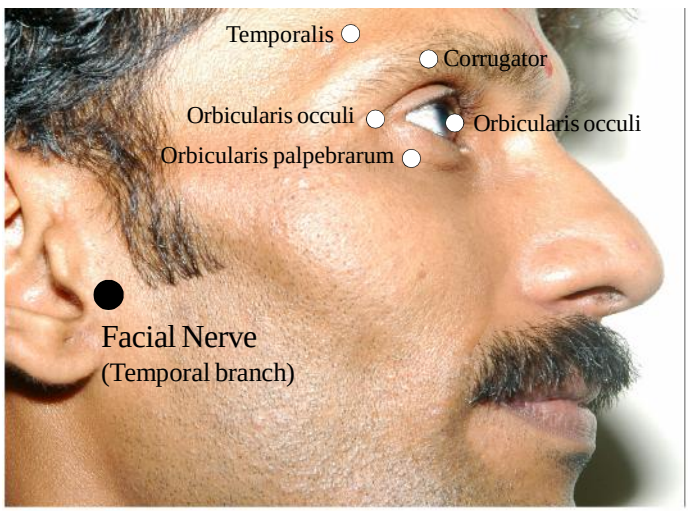
Muscles of hand and forearm - back (posterior) view



Muscle of leg - front (anterior) & side (lateral) view



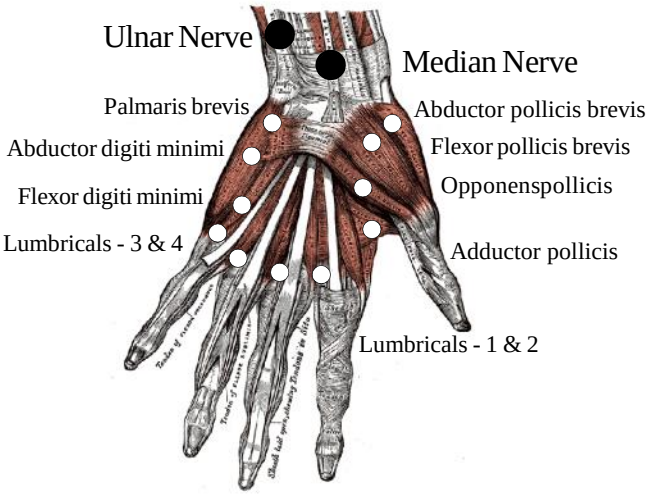
Muscles of eye - front (anterior) view



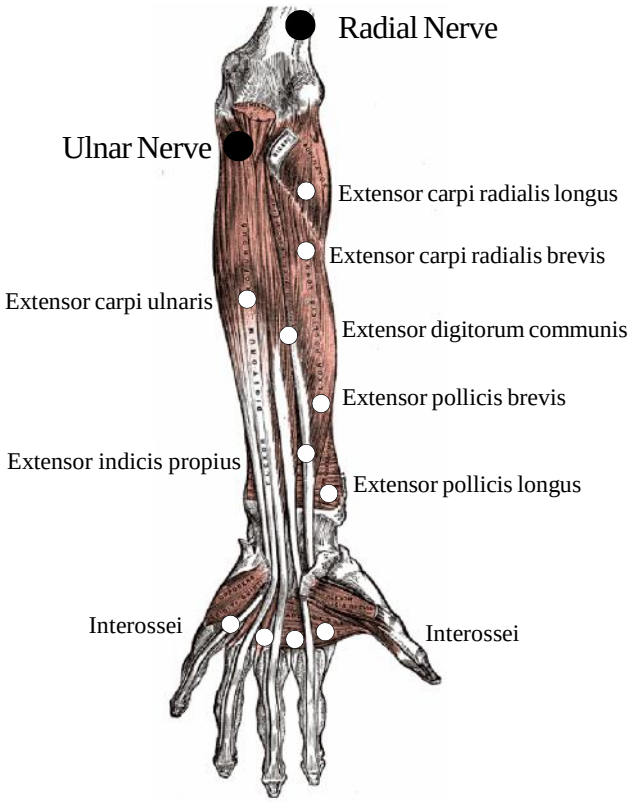
● Nerve point ○ Motor point

Nerve and Motor Points

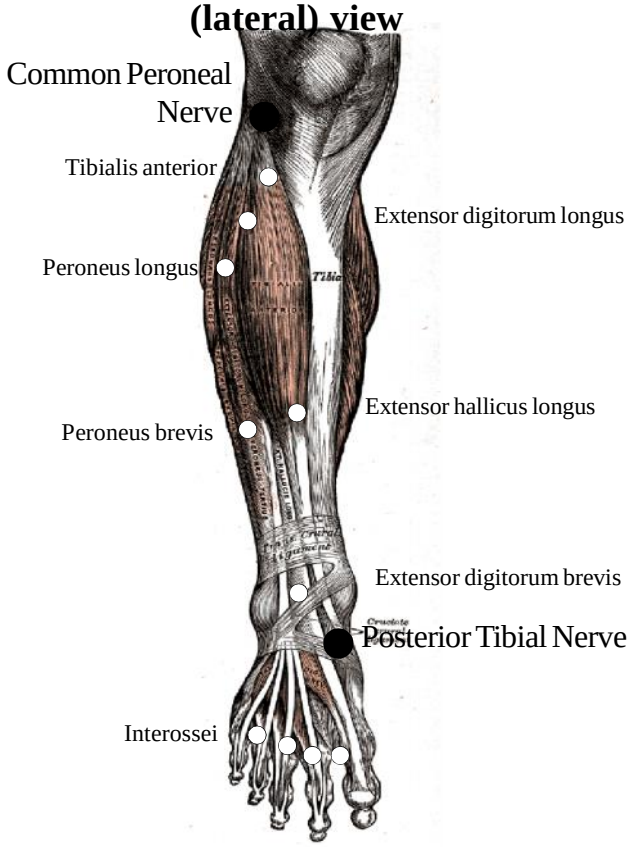
Muscles of hand - front (anterior) view



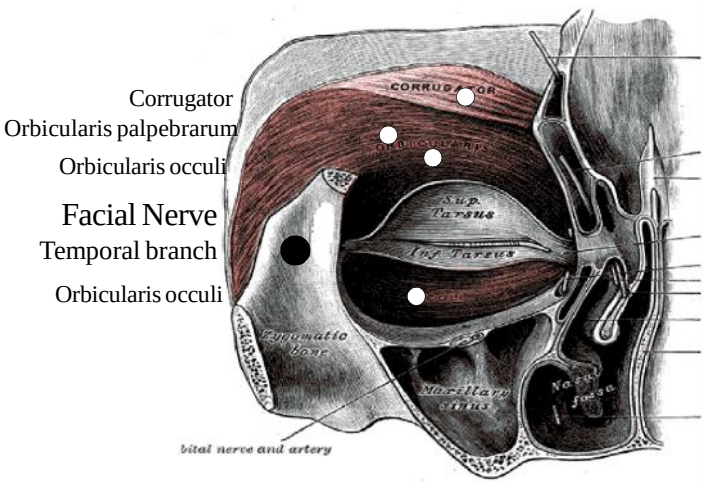
Muscles of hand and forearm - back (posterior) view



Muscle of leg - front (anterior) & side (lateral) view



Muscles of eye - front (anterior) view



● Nerve point ○ Motor point

5
Bones and Joints

Structures and Functions

Exercises for maintaining joint mobility

Pre-fabricated splints for hand deformities

Wax-therapy for stiff joints

BONES & JOINTS

Structures and Functions

Types of bones

- Long bones – Upper arm
- Short bones – hands
- Flat bones – shoulder blade
- Irregular bones - vertebra

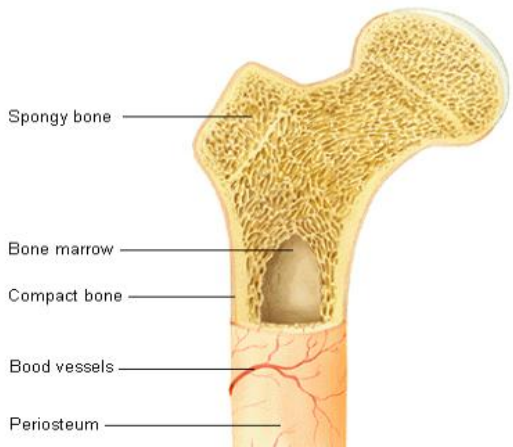
Bone - Functions

- Offer shape to the body
- Protect and support the soft parts
- Serve as muscle attachment
- Metabolistic function (forming blood in the red bone marrow).

Bones - Structures

- Hardest material in the body
- Bones (Passive) & Muscles (Active) **- Locomotor system**
- Lengthwise growth ends at the age of 18 – 20
- Growth in thickness continues throughout the life
- Constant remodelling whenever the bone tissue is damaged.
- All bones are enervated

Parts of bone

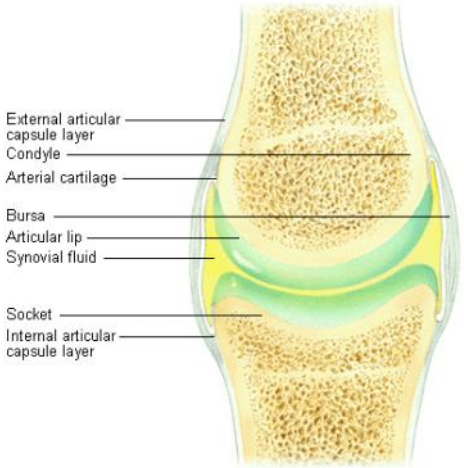


Joint - Types

- Synovial joints connect atleast two articular bones and permit maximum movement.
- Fibrous joints connect two bones by means of elastic or collagen connective tissue and permit minimum movement.
- Cartilaginous joints are permanent connections between two bones and permit no movement.

Types of Synovial Joints

- Ball & Socket joint
- Hinged joint
- Pivot (Conical) joint
- Saddle joint
- Ellipsoid joint



Joint movements

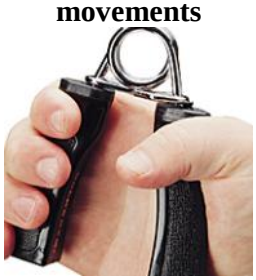
- Each joint has a specific degree (Range of motion - ROM) and direction of movement.
- Movements are mainly performed by the muscles attached to the bones that form a joint.
- Movements occur at one or more bones of a joint through a single (Hinge & Pivot) or multiple (Ellipsoid & Saddle) axis.

Physiotherapy

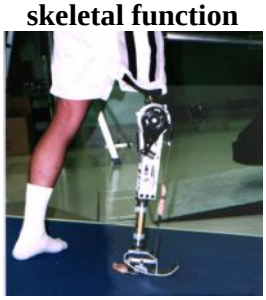
- Pain control – Electro-medical equipments
- Mobility – Graded and controlled movements
- Stability – Orthosis and Prosthesis
- Integrity – Functional and occupational re-education.

Controlling pain through heat energy

Encouraging joint movements



Restoring musculo-skeletal function



Muscle & senses coordination

BONES & JOINTS

Exercises for maintaining joint mobility

Exercises - Purpose

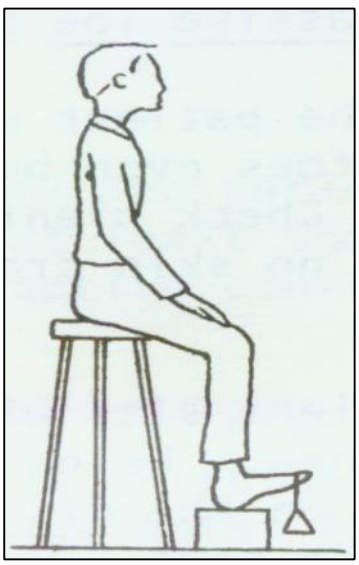
- Put the joint to its full range of motion or to the maximum possible extent.
- Maintain or improve joint mobility
- Strengthen the weak muscles
- Prevent or releases tissue contracture (shortening)
- Increase the functional ability

Types of exercises

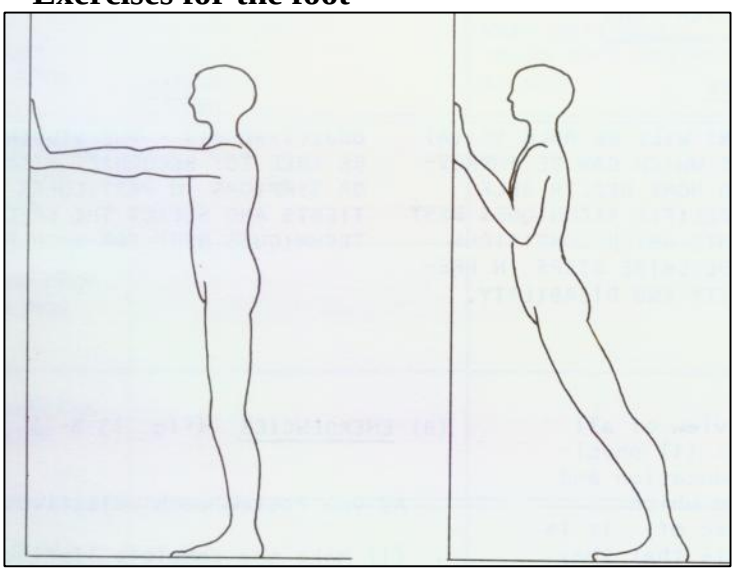
- Active & Passive
- Active – moving the joints by the voluntary muscle action without any support
- Active resisted – moving joints by the voluntary muscle action against resistance
- Active assisted – moving joints by the weak muscles with support to make full movements.

Active exercises for hands

Exercises for the foot



Strengthening exercise



Passive stretching exercise of Tendo-Achillis

BONES & JOINTS

Pre-fabricated splints for hand deformities

Type of splints:

- **Statis splints** are mainly used to support the joints and helps in maintaining its normal anatomical posture. It is also used to rest the injured part of the body. It can be used during night as a 'rest' splint.

- **Dynamic splints** are used to mobilize the affected joints and do mechanical correction. It also assists the patients to do active / passive exercises.

Prefabricated splints:

- There are 4 types of pre-fabricated splints, which are made of locally available materials such as plastic pipe, rexin, rubber bands, rivets and hooks.
- All these splints are available in 3 standard sizes, inexpensive and durable. These splints are well padded and suitable for anaesthetic hands.
- It can be easily applied and removable by the patient himself.

Finger Loop splint

Uses:

- Prevents the formation of finger joint contractures.
- Helps to strengthen the weak muscles in the hand.
- Help doing finger exercises appropriately.

Application:

- Apply the wrist belt at the base of the wrist.
- Fix the loops to each finger while keeping the fingers bent at the base.

Finger Gutter splint

Uses:

- Releases the joint stiffness (mild or moderate stiffness at the PIP joint) of the fingers.

Application:

- Apply the splint to the back of the finger.
- Fasten the splint with the velcro to the base and to the tip of the finger.

Oponnens Loop splint

Uses:

- Prevents or releases the thumb web contracture.
- Helps to keep the thumb in full abduction and assist fine finger movements / activities.

Application:

- Apply the wrist belt at the base of the wrist.
- Fix the broad loop to the base of the thumb.

Adductor Band splint

Uses:

- Prevents the little finger from stretching it outside.
- It also used for ‘re-education’ following ulnar nerve release surgery.
- Can be used during night as a ‘rest’ splint.

Application:

- Apply the band at the base of the finger and fasten with a velcro.

BONES & JOINTS

Wax-therapy for stiff joints

Uses:

- Increases the blood circulation
- Stimulates the sweat glands
- Makes the skin soft and supple
- Loosens stiff joints

Indications:

- Dry or rough skin.
- Stiff and / or painful joints
- Preparing for passive stretching
- Acute neuritis

Contraindications:

- Acute inflammation with or without swelling
- Open wounds / Skin rashes or skin disease like scabies or eczema

Methods:

- Melt the paraffin wax or match wax in a thermostatically controlled tub.
- Add liquid paraffin oil with wax in 1:2 proportion.
- Maintain the temperature of liquid to 110^0 F to 120^0 F or 42^0 C to 49^0 C.
- Use immersion or application method depending on the need and the body part to be treated.
- Take care that the hand should not touch the side or bottom of the container.
- Give heat therapy for 15 - 20 minutes.
- Instruct the patient to warn immediately of any uncomfortable sensation.
- Recycle the used wax by melting in a vessel placed in a vessel containing hot water.

1. Check the temperature and the patients' hand before giving wax-therapy
2. Dip the hand into wax tub and remove.
3. Repeat 4 or 5 times till a thick coat is applied.
4. Wrap the treated hand with a plastic bag or with a tissue paper

5. Instruct the patient not to move his fingers, as the wax will break and allow the heat to escape
6. Again cover the hand with a rexin bag or with a woolen blanket to retain the warmth
7. Instruct the patient to keep the hand in an elevated position

8. After 15 - 20 minutes, unwrap the hand. Remove the wax and use after recycling
9. After wax-therapy, the hand is now ready for exercise. Give wax-therapy once a week.

6
Eyes

Functions and complications

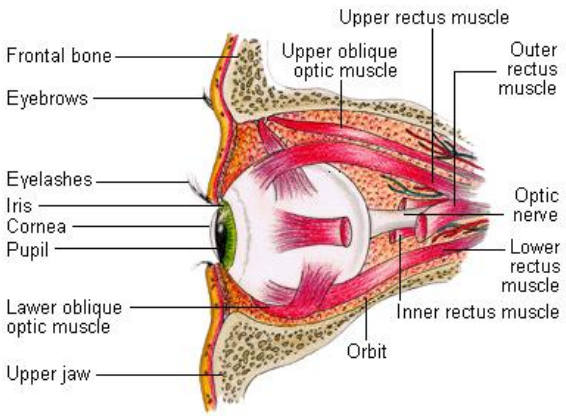
Assessment and care

EYES

Functions & Complications

Parts of Eye

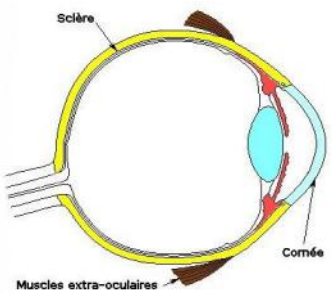
- **Cornea** – Transparent coat of the eye.
- **Sclera** – Thick coat (white part) of the eye continues with cornea.
- **Iris** – Circular membrane back of cornea.
- **Pupil** – Opening in the center of the Iris.
- **Conjunctiva** – Layer which covers the sclera and episclera.
- Eye **lids** and **lashes** – protection.

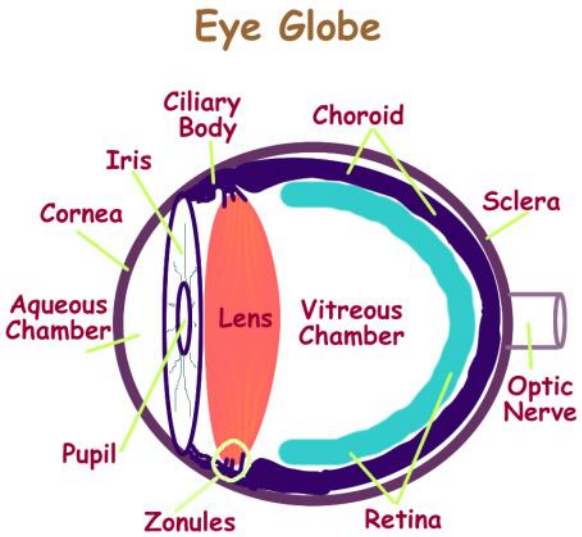


Cornea

- Cornea consists of transparent cells.
- Diameter of 12 mm and thickness of 4 / 10th mm.
- Cornea is 78% water.
- To remain transparent, the cornea should be kept in a good state by tears and by blinking of the lids.

Sclera





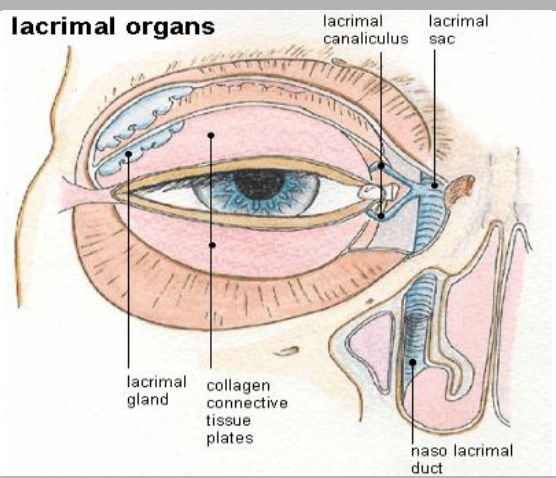
Eye - Functions

- **Outer layer** is divided into sclera and cornea.
- Sclera helps maintain eyeball shape and allows muscle attachment for movement
- Cornea allows light to enter the eye and encounter inner chamber structures.
- **Second layer** of the eye (uvea) divided into three parts: the choroid, the ciliary body and the iris.
- Choroid helps to absorb light to prevent glare and become the ciliary body.
- Ciliary body (limbus) produces a fluid found in the front chamber of the eye.
- Iris gives the eye "color" and muscles control the pupil opening.
- **Innermost layer** (Retina) absorbs light and helps in photoreceptor repair or regeneration.

Lacrimation

- TEAR FILM protects cornea from exposure -made of 3 layers.

1. Mucous layer over cornea
2. Lacrimal fluid
3. Oily layer – secretions from glands.



Blink Reflex

- Initiated when the oily layer breaks down OR if there is a threat of injury to the cornea OR when cornea is touched to check for corneal anaesthesia.
- Blinking is a spontaneous reflex
- Helps in moisturising and washing of cornea with lacrimal fluid of the eye.
- Estimating corneal sensation using the blink reflex would be very difficult.

Eye problems

- Corneal sensory impairment – Trigeminal Nerve of V Cranial nerve.
- Abnormal blink reflex
- Lagophthalmos – Zygomatic and temporal branches of VII Cranial Nerve.
- Excessive lacrimation - tear
- Visual acuity – Clearness of vision

EYES

Assessment & Care

Eye complications

- Iridocyclities – Pain, Photophobia (intolerance to light) & corneal redness.
- Episcleritis – Redness of episclera, may be painful.
- Cataract – Opacity of the lens, grey pupil, reduced vision.
- Glaucoma – intra-occular pressure, Pain

Lagophthalmos

- Lack of protective defensive blink
- Orbicularis oculi muscle has both origin and insertion into nasal bone.
- Drooping lower lid is common (Orbicularis Palpaberum)
- Exposure of sclera - Watering of eyes (Lacrimation)
- Corneal changes - Exposure keratitis
- Trichiasis – Eyelash rubbing the eye ball.

Evaluation of Laghopthalmos

- Observe for normal blink – frequency and symmetrical.
- Observe abnormal signs suggesting corneal insensitivity.
- Instruct the patient to close the eye lids slightly – measure the lid gap
- Check the lid margins – turn ‘in’ or ‘out’

Corneal sensation

- Impaired corneal sensation is seen in some leprosy patients – BL & LL (T2R)
- Quantification of sensory loss in the Cornea is not an easy task.
- Not recommended under field condition due to potential risk for damaging eye.

Testing corneal sensation

- In a particular environment of moisture, dust and air current, a leprosy patient with normal eyes will blink as many times as examiner does.
- If a patient is blinking less frequently or not blinking at all, a corneal anaesthesia test should be performed.
- Use a wisp of clean cotton wool - can easily disrupt the corneal epithelium

Assessing Blink Reflex

- Occurs several times in a minute spontaneously
- Both the upper lid and the lower lid touch each other unconsciously.
- Timing a blink reflex is difficult - arbitrarily set a time (e.g. no blink in 15 seconds).
- Lagophthalmos or orbicularis oculi weakness will preclude a normal blink reflex.

Grade	Disability grading of eye (WHO. 1988)
0	No eye problems due to leprosy and no evidence of visual impairment.
1	Eye problems due to leprosy are present. Vision 6/60 or better. The patient can count fingers at 6 meters.
2	Severe visual impairment (vision less than 6/60, the patient is unable to count fingers at 6 meters), lagophthalmos, iridocyclitis and corneal opacities.

Vision threatening conditions

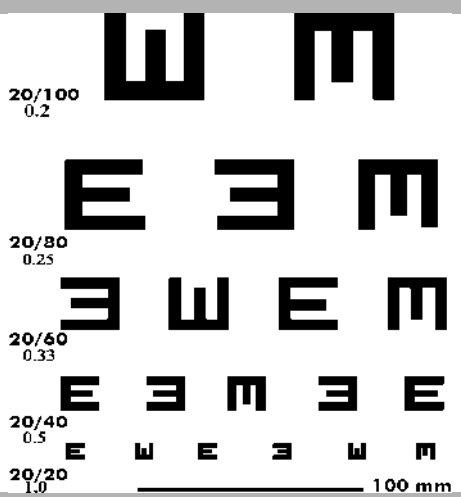
- Corneal anaesthesia
- Corneal ulcer
- Corneal opacities
- Glaucoma
- Cataract
- Lagophthalmos
- Iridocyclitis (difficult to diagnose without a slit-lamp).

Loss of vision

- Corneal anaesthesia alone may take a longer time to develop corneal opacities than corneal anaesthesia & lagophthalmos.
- Patients with lagophthalmos develop corneal ulcers leading to corneal opacity, resulting in loss of vision.
- An anaesthetic cornea with trachoma (with trichiasis and entropion of upper lid) is also damage the vision.

Testing the vision

- Snellen's visual acuity charts - accurate and standardized recording (Finger count).
- Position the patient and chart in a well illuminated site
- Measure the distance - 6 meters either with a tape or length of string.
- Recording other forms of vision such as color, contrast sensitivity and field of vision requires more sophisticated instruments.



Visual Acuity

- Uncorrected vision without glasses or contact lenses.
- Each eye is tested separately, although the vision may be better with both eyes together.
- a person with normal vision should be able to read the small letter on an eye chart (20/20 or 1.0 line)
- Larger the second number is, the worse is the vision.

Vision Assessment

- 20/20 or 6/6 - normal vision
- 20/40 or 3/6 vision - uncorrected in at least one eye - required glasses
- 20/50 or 2/6 vision - worse - to check for cataract - surgery
- 20/200 or 1/10 vision - blind (a person is not legally blind unless both eyes are 20/200 or worse).

Non-leprosy eye problems

- Diagnose and distinguish between leprosy related and non-leprosy related eye problems.
- Lagophthalmos may be due to Bell's palsy
- Ectropion could be age-related
- Corneal opacities, Iritis and Cataract may be due to a number of non-leprosy causes.

Basic eye care

- Perform simple visual acuity testing
- Recognize common eye problems
- Corneal dryness – tear substitute drops, Protect cornea
- Teach patients for basic eye self-care
- Lagophthalmos – Exercises – Forced closure of eye lids.
- Provide tape / eye shades / goggles
- Red eye – Ointment & Refer

7
Leprosy Referral Centre

Monitoring and Evaluation of LRC services

Referral for Surgery – Indication and selection

LEPROSY REFERRAL CENTRE

Monitoring & Evaluation

Classification of deformities

- **Primary** – disabilities / deformities caused directly due to nerve damage. (e.g. Corneal anaesthesia and Claw hand)
- **Secondary** – Deformities caused as a effect of primary deformities. (e.g. Trophic ulcer and shortening / absorption)
- **Specific** – Deformities caused directly by M.Leprae infiltration. (e.g. Depressed nose and loss of eye brow)

Specific deformities

Primary deformities

Secondary deformities

LRC – Clients

- Leprosy suspects
- Leprosy patients under MDT
- High risk leprosy patients
- Disabled leprosy patients
- GHC personnel (Indirect)

Quality care through LRC

- Technically competent
- Comprehensive services
- Client views and judgment
- Client awareness / motivation
- Staff attitude & accessibility

Patient Assessment

- WHO Disability Grading (1988)
- EHF Score – Sum of the WHO disability grading in Eyes, Hands & Feet (Min – 0; Max – 12)
- Useful for 'group' and not for 'individual'
- Not sensitive when compared to changes following sensory and motor assessment.

LRC – Quantitative output

- Number of suspect cases confirmed as leprosy.
- Number of risk cases assessed for nerve function assessment.
- Number of new cases detected having silent neuritis.
- Number of disabled cases provided disability services at LRC.

LRC – Qualitative output

- Proportion of new leprosy cases completed MDT without disability.
- Proportion of 'risk cases' prevented from developing new disability.
- Proportion of deformed cases improved with POD services.
- Proportion of Grade II cases changed into Grade I.

LRC – Monitoring & Evaluation

- Change in Disability / deformity status – More sensitive but not changes are variable (Not constant)
- Change in EHF Score – Less sensitive but does not reflect changes
- Change in WHO disability grade – Not sensitive – For epidemiological data collection

SURGERY IN LEPROSY

Indications & Selection

Type of surgery in leprosy

- Nerve release
- Tendon transfer
- Skin graft
- Bone block
- Joint fixing

Indication

- **Nerve surgery** – Nerve pain or impending paralysis not responding to steroid therapy.
- **Tendon transfer** – Established muscle paralysis without any joint stifness.
- **Skin graft** – Simple wounds without any infection.
- **Joint fixing** – Neuropathic or disorganized joint

Criteria for selection

- Free from trauma / infection / reaction
- Age between 15 – 40 yrs.
- Preference to female who need cosmetic correction.
- Type of deformity (Partial / Total)
- Joint mobility (Hyper-mobile / Mobile)
- Nature of occupation of the patient.
- Motivation of the patient & family.

Post - Operative Goals

- Protection
- Control of swelling
- Muscle re-education
- Restore joint movements
- Safe daily use

Protection

- Cast removal
- Prevent undesired movements
- DO NOT DEPEND ON PAIN
- Provide skin care
- Removal of sutures
- Apply temporary splint

Control of swelling

- Ensure blood circulation
- Bed positioning
- Elevation for 2 / 3 weeks
- Teach active exercises
- Deep breathing exercises
- Elastic bandage

Muscle re-education

- Teach to make new movements by gentle muscle contraction
- Palpate the transferred tendon during movement
- Protect new tendon attachments during movements
- Recognize tendon adhesions
- Apply temporary splints

Restore joint movements

- Place the operated part in functional position
- Start proximal joint movements to develop flexibility & strength
- Teach graded / assisted exercises using the new muscle
- Do not allow too strenuous exercise during early post-op

Safe daily use

- Encourage lightly resisted exercise
- Teach to recognize warning signs
- Increase resistance by increasing size / weight of objects
- Learn to use the new movement regularly in his / her daily skills
- Avoid hard labour / work for at least 2 months

‘Corrective surgery should not be undertaken if post-operative training is not possible . . . . . .’

‘ESSENTIAL SURGERY IN LEPROSY’
by H Srinivasan & DD Palande
World Health Organization, 1997

LEPROSY ELIMINATION ACTION PROGRAMME (LEAP)
High Risk Case Assessment & Service Record

Place of LRC:	
District:	Block / Area:
Taluka / Ward	UHP/ PHC:
MDT Regd. No:	HR Regd. No:
Date of MDT start:	Date of RFT:

Name of patient:

Year of birth: / / Age Sex M F Type MB+ MB- PB

Address:

District:: State:

Telephone No: Mobile No:

Category of high risk: MB case (> 5 skin lesions) ☐

Case with enlarged trunk nerve ☐ Lesion on the course of nerve / face ☐

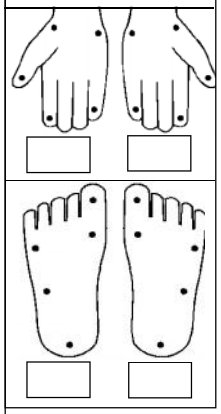
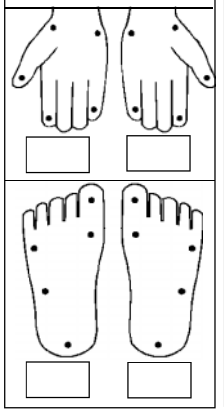
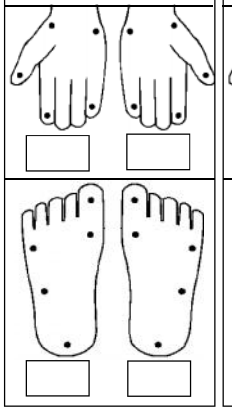
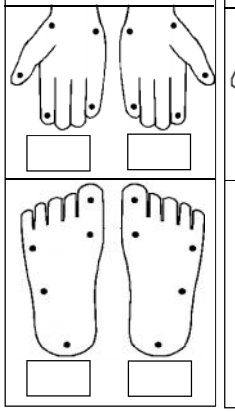
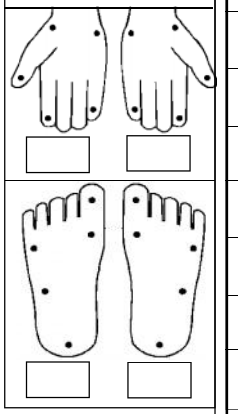
History of reaction / neuritis ☐ Reproductive / Adolescent age group ☐

Date of deletion: / / Reason :

Nerves	**Date**																								
	Side	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt
Ulnar	Nerve																								
	Sensation																								
	Motor - Little finger out																								
Median	Nerve																								
	Sensation																								
	Motor - Thumb up																								
Radial	Nerve																								
	Sensation																								
	Motor - Wrist up																								
Lat. Popilteal	Nerve																								
	Sensation																								
	Motor - Foot up																								
Post. Tibial	Nerve																								
	Sensation																								
Facial	Motor - Close eyelids																								

Key: For **Nerve** - **'N'** - Trunk nerve normal; **'E'** - Nerve enlarged / thickened compared to normal nerve; **'T'** - Nerve tender on palpation or painful; **'A'** - Abscess formation.
For **Sensation** - **'P'** - Sensation present - able to feel; **'A'** - Sensation absent - Complete loss of sensation (with ball-point pen); *Write the filament number, if nylon filament is used to test the sensation.*
For **Motor** - **'S'** - Strong muscle and able to perform movement against full resistance; **'W'** - Weak muscle and unable to perform movement against little resistance; **'P'** - Paralyzed muscle and no movement

Sensory assessment : (To use only when the duration of sensory loss is less than 6 months)

Date:	Date:	Date:	Date:	Date:
				

Method to monitor sensory recovery:

Test for sensation on all the 5 points in each limb (Total 20 points) with a ball-point pen.

Mark '✓' for normal sensation or 'x' for loss of sensation on the corresponding dots.

Count the number of dots having 'x' mark and write on the box below the respective limbs.

Treatment of complications:

Date					
Type of complication *					
Treatment / drugs					
Steroid starting date					
Initial dose (mgms)					
Steroid end date					
Total duration (months)					
Result **					

Key:

***Type of complication** (Write the Alphabet)**: 'A'**. Type I (only skin); **'B'**. Type II (only ENL); **'C'** Acute neuritis; **'D-1'** Silent neuritis-sensory loss; **'D-2'** Silent neuritis-muscle weakness

****Result** (Write the number)**: '1'**. Reaction / Neuritis subsided; **'2'**. Sensation improved; **'3'**.Muscle power improved; **'4'**.Recurrent reaction; **'5'**.New deformity; **'6'**.Deletion-drop out

60

Assessment / advise / services: (To fill once a year)

Date					
Taught Pre-disability signs					
Muscle stimulation					
Strengthening exercises					
Splints - hands					
POP slab / Sling					
Referred for surgery					
Eye care					

Outcome: (To assess 5 years after from the date of registration)

Developed new disability / deformity : YES NO Date:

Released from 'risk' status: YES NO Date:
(If not developed new NFI for 5 years from RFT)

Attendance at LRC: Mark **'P'**, if patient has attended (or) **'A'**, if the patient didnot attend LRC

Year																									
Week	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Jan																									
Feb																									
Mar																									
Apr																									
May																									
Jun																									
Jul																									
Aug																									
Sep																									
Oct																									
Nov																									
Dec																									

LEPROSY ELIMINATION ACTION PROGRAMME (LEAP)

Disability Assessment & Service Record

						District:	Taluka / Ward:
						UHP/ PHC:	LRC Name:
Name of patient:						MDT Regd. No:	POD Regd. No:
Year of birth: / /	Age:	Sex	M	F	Type MB PB	Date of MDT start:	Date of RFT:
Address:						Type of occupation (Specify):	
						Eligible for surgery: Yes No	Willing for surgery : Yes No
District:: State:						Date of deletion from POD register: / /	Reason :
Telephone No: Mobile No:							

Disability care and services: **(Use '✓' mark, if services are given atleast once a year)**

Assessment / advise						**Disability services**					
Year						**Year**					
Assessment						Steroid therapy					
Self care						Muscle stimulation					
Oil massage						Wax therapy					
Exercises						Ulcer dressing					
Eye care						POP Cast					
Disability aids						**Referrals**					
Year						**Year**					
MCR sandals						Investigations					
Hand splints						Admission					
Goggles						Surgery					
Ulcer Kit						Prosthesis					
MCR insole						Rehabilitation					

Attendance at LRC: Mark **'P'**, if patient has attended (or) **'A'**, if the patient didnot attend LRC

Year																								
Week	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Jan																									
Feb																									
Mar																									
Apr																									
May																									
Jun																									
Jul																									
Aug																									
Sep																									
Oct																									
Nov																									
Dec																									

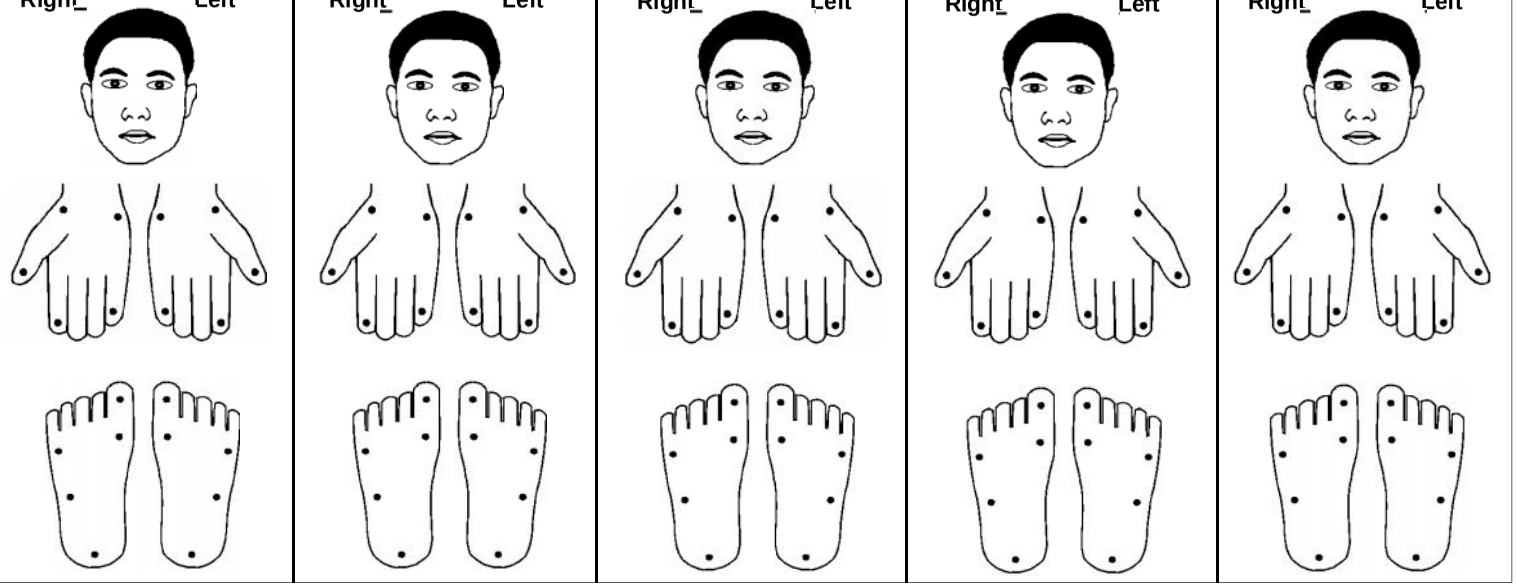
Note: Mark '**P**', if the service is delivered to patient at the PHC level or at community level

Disability / deformity assessment:

Date of assessment:	Initial:	Year 1:	Year 2:	Year 3:	Year 4:

Key	Disability / Deformity	Duration
✓	Sensation present	
X	Sensation absent	
➤	Mobile claw finger	
S	Fixed claw finger	
Z	'Z' / Ape thumb	
↓	Wrist / Foot drop	
⊗	Ulcer Wound	
■	Absorption	
➤	Lagopthalmos	
⇆	Facial Palsy	

Right Left



Disability Assessment: (To fill once a year)

Date										
Side										
Sensory										
Injury / wound										
Mobile claw										
Fixed claw										
Ape thumb										
Wrist drop										
Foot drop										
Plantar ulcer										
Lagopthalmos										
Facial palsy										

*** Key: 'I'** - Improved; **'S'** - Static; **'W'** - Worsened

WHO disability grade: (To assess once a year) '**0**' No disability; '**1**' Anaesthesia; '**2**' All visible deformity

Year												
Side	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt
Eye												
Hand												
Feet												
EHF*												

*** EHF score:** Add disability grades of eyes, hands & feet; Minimum score is '0' & Maximum score is "12"

Specialized services: (To fill only when specialized services are provided)

Type of services	Date	Details	Result
Socio-economic rehabilitation			
Reconstructive surgery			
Treatment of eye complications			
Prosthesis / Orthosis			
Any other - specify			

8
Miscellaneous

Complications in leprosy
Information, Education & Communication
Counselling in leprosy
Socio-Economic Rehabilitation in Leprosy

Complications in Leprosy

Reactions & Relapses - Management

Lepra Reactions

- An acute exacerbation

(both, clinically and histologically)

TYPES OF REACTIONS

Type I – reversal or down grading

Type II-Erythema Nodosum Leprosum (ENL)

Precipitating factors for reaction

- Intestinal worms, inter-current infection
- Physical / mental stress / strain, puberty, pregnancy, parturition.
- Surgical intervention, vaccination

Type I Reaction

Ag from breaking down from leprosy bacilli

↓

Reacts with T lymphocytes

↓

Rapid change in CMI

↓

Delayed hyper-sensitivity reaction/type IV hyper-sensitivity

Type I - Reaction

- Alteration in the degree of cellular immunity (CMI)
- Occurs in patient with Borderline Disease (BT/ BB/ BL)
- REVERSAL when the shift in CMI is upward- towards Tuberculoid spectrum.
- DOWNGRADING when the shift is towards Lepromatous spectrum.

Type I Reaction – clinical features

- Skin Lesions- Swollen & Erythema followed by desquamation & some times by ulceration. Lesions painful and tender
- New Lesions- Uncommon
- Nerves - May accompanied by Acute Neuritis - one or more nerves swollen, extremely painful and tender.
- Systemic Illness -Uncommon
- Other Manifestations - Nil

Type II reaction

Antigen - Antibody reaction
↓
Humoral Antibody response
↓
Type III hypersensitivity

Type II - Reaction

- Occurs in patient with Lepromatous Disease (BL/LL)
- Presents with ulcerated nodules.
- LUCIO Phenomenon

Type II Reaction – clinical features

- Skin Lesions- Superficial or subcutaneous painful red nodules (ENL), common on face and extensor surface of the limbs.
- New Lesions- New ENL common.
- Nerves - All affected nerves are involved- enlarged and tender. But neuritis in ENL is not as deformity threatening as in Reversal Reaction.
- Systemic Illness - Common - fever, headache, insomnia, depression, arthritis
- Other Manifestations - Iridocyclitis, Orchitis, Dactylitis, Lymphadenopathy

Reaction Management

- Anti-inflammatory Therapy
- Analgesic Therapy
- Antibacterial Therapy
- Physiotherapy
- Surgery
- Counseling

Steroid Therapy is the drug of choice

Contra-Indications

1. Tuberculosis
2. Diabetes
3. Hypertension
4. Peptic Ulcer
5. Inter-current Infections

Particulars	**Steroid (Prednisolone) - Adult**		**Clofazimine - Adult**
	Only skin manifestation	**Acute Neuritis & NFI of < 6 months duration**	**Recurrent Reactions (especially ENL)**
Initial dose	40 mg per day (Morning single dose)	60 mg per day (Morning single dose)	100 mg thrice a day for 2 months
Taper off dose	10 mg every 2 weeks up to 20 mg per day then 5 mg every 2 weeks	5 mg every week up to 40 mg per day then 10 mg every 2 weeks up to 20 mg per day then 5 mg every 2 weeks	100 mg twice a day for 2 months
Cut Off Dose	5 mg per day		100 mg once a day
			50 mg once a day

RELAPSE

- With MDT relapse rate is very negligible in the context of mass programme.
- Causes: Inadequate treatment, Persister M.leprae, Resistant (not reported in MDT treated patient).
- Usually occurs after 4-5 years after MDT stopped in MB cases. In PB it may be earlier.
- However when Relapse is suspected rule out lepra reaction by treating patient with steroid initially.
- Re-start MDT as per the type of the disease.

Complications of Leprosy

Though occur in small proportion of leprosy cases, they are the root-causes of social stigma.

- ALWAYS BE WATCHFUL.

Detect any complication at an early stage.

- AVOID LEPROSY SEQUELAE.

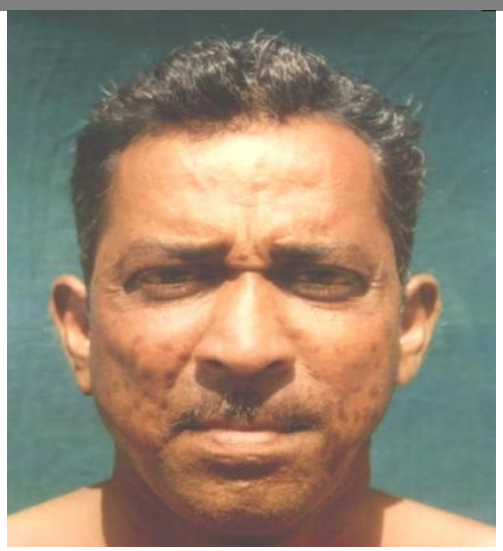
- ENSURE MEDICAL AND SOCIAL CURE

in every leprosy case you diagnose and treat.

Type I reaction – Pre treatment

Type I reaction – Post treatment

Type II reaction – Pre treatment



Type II reaction – Post treatment

Information, Education & Communication (IEC)

Goals

- Counsel patients and family members.
- Increase their self confidence (*manobal*)

Difference between Information & Education

- Education implies proper action on the part of the receiver.
- Communication implies sharing of ideas and thoughts.

Knowledge
↳ Aptitude
↳ Practice (Behaviour)

Sense organs used for communication.

1. Vision
2. Hearing
3. Touch
4. Taste
5. Smell

By all living objects – Plants, animals

Steps of communication

Message
Speaker ⟶ Listener
Medium

Barriers of communications

1. Physical – Distance, Noise
2. Mental

Effective communication

Language

- Simple
- Short sentences
- Pronunciation: Distinct & clear
- One message at one time

Media

1. Person
2. Mass

Merits & Demerits

- Word of mouth – most effective
- Press
- Radio – Audio only, usually one way
- TV – Audio-visual & movement
- Film – Audio-visual & movement
- Exhibition – Stationery and Mobile
- Street play – Recreation & Education
- Advertisements, Hoardings, Leaflets, Pamphlets, Flip charts, Album, Posters

- Press – Literates
- Radio / TV / Film – Illiterates
- More than one speaker – No credibility gap
- Health Education – Master key of all the health programmes
- HE – Everybody's concern

Objects of HE

1. Case detection
2. Case holding – Regularity of treatment
3. Prevention of dehabilitation
4. Rehabilitation

Target groups

- Patients – Regularity of treatment, Self-care – Eyes, Nose & Limbs
- Colour of drugs – eg. Rifampicin, CLF
- Persistence of patches, sensory loss
- Surveillance period & rapport.
- Relatives, Friends & family members
- Employers
- Community leaders (Social, Political, Religious)
- Teachers, social workers

Target groups

- Administrators, Sarpunch
- Service clubs - Rotary, Lions, Lioness, Inner-wheel, Giants
- NSS, NCC, Scouts & Guides
- College students, School students
- Festival organisers, Sports' clubs
- Workers of allied departments - AWW,CHV,CHW,VHG,
- Mahila mandals, youth clubs
- General Medical Practitioners

Facts to be projected

- Caused by germs
- Not hereditary
- Least infectious
- Curable with MDT
- Deformities preventable
- Common signs & Symptoms

Impact of HE

1. Increase in voluntary reporting
2. Drug compliance-complete & regular
3. Doing away with social stigma / legislation
4. CBR
5. PO Dehabilitation

Free examination & treatment for leprosy is available at Primary Health Centres, Govt. & Para-Govt.

and

Municipal Dispensaries & Hospitals as well as at Urban Health Centres & Health Posts

Local NGLOs offer help in : counselling, rehabilitation, physiotherapy & health educational programmes.

They can provide literature & undertake training (Capacity Building)

Counselling in Leprosy

Process of therapeutic communication

- To resolve a crisis
- Solve a problem
- Make decisions

By involving affected person

Dialogue between affected and provider (service / care)

- **aimed at** enabling to cope with situation / problem

to take personal decisions

Counselling

- Education about health forms an integral part of counselling in health related areas.
- Not synonymous with health education.

Purpose of counselling

- Assist to explore situation
- Identify & act
- Express feeling
- Build / give confidence

Counselling

- It is the means to help through purposeful conversation.
- Method of identifying practical solutions to life or work related problems.
- Facilitates the making of choices for action / behaviour within the limitation of given environment**.**

Pre requisites of counselling

- Time
- Purpose
- Acceptance
- Accessibility
- Confidentiality
- Consistency and accuracy

Conducted in a conducive environment

Counselling process

Exploring
↓
Understanding
↓
Acting
↓
Interacting
↓
Involving

Rapport building

- Empathy
- Unconditional positive regard
- Genuineness
- Acceptance
- Communication skills

Counselling is both an "art" and a "science"

- Art – Counsellor's personality, technique and skill.
- Techniques – work effectively

Communication process in counselling

- Listening
- Attending
- Processing
- Feedback
- Probing
- Confronting
- Interpreting
- Self-disclosure
- Contracting

For Counsellors

Do – ask questions, listen actively, observe body language, ascertain the core problem, be patient, remain neutral.

Do not – offer solutions, give advice, be critical or judgmental, jump to conclusion, show emotion.

Counselling

- Counselling is the means by which one person helps another through purposeful conversation.
- It is a process of enabling the patient / affected to express their feelings and create a physical and psychological environment in which patient / affected feel confident enough to take their own decision.

Building confidence

Inform

Interact

Involve

Socio-Economic Rehabilitation (SER)

Programme under LEAP

Disability consequences

- Lack of understanding about disability
- Lack of awareness on prevention
- Negligence to protect affected limbs
- Adjustment in ADL and occupation
- Do not care due to process of economic condition.

Disability - Opportunities

- Reduced opportunity for education
- Decreased output in production
- Lack of employment prospect
- Low priority to leprosy disability among other disabled
- Diminished social security

Rehabilitation process

- Situation analysis
- Assessing the individual needs
- System of service delivery
- Community involvement
- Coordination with organization for the disabled
- Ensuring basic human and legal rights
- Strong political will and support

Types of rehabilitation

Institution based rehabilitation (IBR) – till 1974

Community based rehabilitation (CBR) – after 1974

Institution based rehabilitation (IBR)

- Considered as a ‘charity’
- Isolation of patients for prolonged period
- Small number of patients benefit
- Expensive and require huge investment
- May precipitate stigma and fear

Community based rehabilitation (CBR)

- Promotes community participation
- Integrated programmes
- Large number of beneficiaries
- Coordinated & multi-sectoral effort
- Practised by community health workers
- Cost-effective

SER - Category

1. No physical disability and having no social or economic problem.
2. Physical disability present but no social or economic problem.
3. No physical disability but having social or economic problem.
4. Physical disability present but social and economic life is under threat.
5. Physical disability present bur social and economic life is already dislocated.

Need based assessment

- Physical capability – limitation in activity.
- Social interaction – limitation in community participation
- Present basic skills and qualification
- Suitability for vocational training
- Scope for income generation activity
- Coping mechanism / Dependency
- Family and community support

SER - Possibilities

- Assistance for self employment
- Education sponsorship
- Job placement
- Welfare schemes
- Vocational training (Integrated)
- Support for subsistence

Causes for dehabilitation

- Disease
- Physical
- Economical
- Social
- Political

Assistance for self employment

- Loan for capital investment to start new business or strengthen existing business (Most preferable)
- Age group: 20 – 50 years
- Preferably non-deformed
- If deformed, involve spouse or other adult member in the family.
- Select appropriate business
- Training on income generation activity

Education sponsorship

- Financial assistance for formal education (Higher secondary)
- Financial assistance for technical education – Computer / ITI / Accountancy
- Age group: 12 – 30 years
- Network with local education institutions
- Integrated education programmes

Job placement

- Recruitment under reservation in private and public sector
- Networking with the Labour welfare Officer in private and public sector
- Age group: 18 – 28 years
- Should have reservation privilege
- Arrange for disability certificate (Disability Act 1995, GOI)

Disability Certificate

- Categories - < 40% / 40 – 80% / > 80%
- Cured leprosy patients with deformity on more than one limb - > 40%
- All Civil Surgeons or Designated Orthopaedic Surgeon from recognized institutions.

Welfare schemes

- Govt. welfare schemes from MOSJE / MOL / MOE.
- Rural and Tribal welfare department
- Service Organizations – Rotary / Lions
- Corporate sector under CSR

Vocational training

- Vocational training centre
- Sheltered Workshop
- Integrated training programme
- Disabled Peoples organization
- Self-Help Groups
- Private training institutions

Support for subsistence

- Self-settled colonies
- Destitute homes
- Training of care-givers
- Food ration
- Pension scheme
- House construction

SER Programme

- What are the category of patients to whom SER intervention is addressed?
- What are the needs of the individual to make him self reliant?
- What are the needs in the community?
- What are the abilities of the individual?
- How much economic loss due to leprosy?
- What are the trades that are relevant to local situation and can generate income?
- How many persons will benefit under each type of SER intervention?
- What are the resources required?
- Project scope for sustainability
- Anticipate the potential risks

Identify the potential trade

Assess the local needs