# Treatment of Orthopedic Disorders

There are three time-tested and time-honored treatment

methods:

1. Masterly inactivity,
2. Conservative methods,
3. Operative treatment methods

**Masterly Inactivity**

It is interesting to observe that nearly **50% of the orthopedic disorders can be managed best by not doing anything**.

To allay the doubts, fears, myths, and misconceptions, a patient has regarding his ailment and assuring him that nothing is seriously wrong with him is all that is required.

This is more of a ‘mind’ management than ‘orthopedic’ management and is more a ‘human’ care than ‘health care’!

## Conservative Methods

This is the next commonly advocated and recommended method of treatment.

**Rest**

This implies not total rest but selective rest with avoidance of unnecessary activities and strain. H.O Thomas first advocated this and of late due to improved methods of treatment and technology; emphasis is now on early restoration of activities and not passive rest.

**Support**

This enables the diseased part to heal, provides rest, prevents deformities, relieves pain and also supports the patients psychologically, e.g. plaster splints for fractured limbs, lumbosacral belts and corsets for low backache, calipers in polio, cervical collars for neck pains, knee cap,

ankle binders.

**Traction**

This is a popular method of treating certain chronic orthopedic conditions like low backache, cervical spondylosis.

In these conditions, it is known to reduce pain, muscle stiffness, spasm.

Supportive braces:

(A) Knee support cap;

(B) Ankle support;

(C) Elbow support

Neck and back supports:

(A) Cervical collar;

(B) Sacrolumbar support

## Physiotherapy

Physiotherapy, if properly understood and skillfully executed by trained persons, gives excellent results in treating orthopedic disorders and in postoperative rehabilitation.

For optimum results, physiotherapy should be pursued systematically until its final logical conclusion and should not be abandoned in between.

Physiotherapy has a great role to play and sometimes is the only treatment option in diseases like polio, cerebral palsy, hemiplegia, paraplegia.

The following are the various physiotherapy options:

### • Active exercises:

Here the patient is made to actively contract his or her muscles and joints against resistance and weight. This helps to mobilize the joints, strengthen the muscles and to improve coordination or balance.

### • Passive exercises:

This can be given by the physiotherapist normally or by machines which can provide continuous passive movements of the joints. This is of immense help to maintain the mobility of all the joints

when active movements are not possible due to paralysis or injury to the muscles. Thus, the joints are kept supple and deformities are prevented

**Note:** Active muscle strengthening exercise could be either isometric (here muscle does not move and hence no change in length, e.g. pushing against a static object) or isotonic (here muscle actually moves, e.g. quadriceps

exercises).

• Electrical muscle stimulation:

Depending upon whether the nerve supply of a muscle is intact or not, two types of electrical stimulation is chosen:

**Faradism:**

In this, the nerve supply of the muscle should be intact.

In faradism, an electronic stimulator delivers shocks at shorter duration at a frequency of 1 mm at 50 Hg to the muscle through its intact motor nerve root, e.g. for regaining the strength of intrinsic muscles of the hand and foot, quadriceps muscle and to retain the tendons after tendon transfers.

**Galvanism:**

Here the muscle is stimulated directly with shocks of longer durations (100–1000 mm at frequency of 5–15 Hg).

When the muscle is denervated after a peripheral nerve injury, etc. this treatment modality helps.

• Hydrotherapy:

This is particularly useful in patients suffering from rheumatoid arthritis. The warmth and

buoyancy of water helps to relieve pain and muscle spasm.

• Heat therapy

Direct application of heat the local temperature underneath the tissues rises up to 10° inducing vasodilatation, reduced muscle spasm and decreased pain.

There are two varieties of heat therapies:

– **Surface heat:**

This heats only the superficial tissues and consists of hot packs, infrared heat, paraffin

wax bath.

**– Deep heat:**

Apart from vasodilatation, it stimulates the circulatory mechanism and helps in heating the

deeper structures.

It is also helpful in treating joint disorders, e.g. shortwave diathermy, ultrasound,

interferential heat therapy.

• Manipulation:

This term denotes a deliberate attempt by the surgeon to passively move the joints bone or soft

tissues.

It is useful in three specific purposes:

– **Manipulation for correction of deformity**:

Closed reduction of fractures and dislocations and manipulation of a clubfoot falls under this category.

This is done under general anesthesia and after the correction; the part is immobilized in splints, etc. to retain the correction.

**– Manipulation for joint stiffness**:

This is useful in the knee joints, it may be successful in shoulder and foot but responds poorly in cases of elbow and hand.

The manipulation should be done gradually under general anesthesia and forcible or abrupt movements should be avoided.

**– For relief of chronic pain**:

Manipulation may help in chronic pain of shoulder tarsal, spine or sacroiliac joints.

**Note:** Manipulation should not be done in acute painful conditions for fear of aggravating the problem.

Massage:

Delicate, continuous and systematic massage if done regularly has a lot of beneficial effects like relief of pain, soothening effect.

## Radiotherapy

It has a role in:

• Inflammatory conditions like recalcitrant ankylosing spondylitis.

• Neoplastic conditions, e.g. Ewing’s sarcoma and giant cell tumor recurrence.

## Drugs

Drugs though limited have an important role to play in orthopedic practice.

The commonly used ones are:

• **Analgesics and anti-inflammatory agents:**

These helps relieve pain and inflammation.

Long-acting drugs are preferred in chronic disorders like rheumatoid arthritis, etc. while short-acting drugs are preferred in acute infections, trauma.

**• Muscle relaxants:**

These are useful to relieve painful muscle spasms.

**• Sedatives and anxiolytics:**

These are used to induce sleep, alleviate anxiety and to relieve muscle spasm.

**• Antibiotics**

These are extremely useful in acute and chronic infections of bones and joints.

Broad-spectrum, bactericidal agents are usually preferred.

**• Hormones:**

Growth hormones, stilbestrol for metastatic carcinomas, anabolic steroids and estrogens for osteoporosis are some of the examples.

**• Specific drugs:**

Vitamin C for scurvy, vitamin D for rickets are some of the examples.

• **Cytotoxic drugs:**

These are used as chemotherapeutic agents for malignant tumors.

## Operative treatment Methods

Operative treatment should be resorted after great deliberations and when all other treatment options have been tried or thought of.

Once undertaken, it should not worsen the condition of the patient.

A brief account of various orthopedic surgical techniques is presented here.

### Osteotomy

This is a procedure of creating a surgical fracture to achieve the following objectives:

• To correct excessive angulations, bowing or rotation of a long bone.

• To compensate and correct the malalignment of a joint.

• To correct leg length inequality either by shortening or by lengthening.

• To alter the line of weight bearing and increase the stability at the hip joint, e.g. abduction osteotomy.

• To relieve the pain in an arthritic hip, e.g. displacement osteotomy, high tibial osteotomy, etc.

**Upper limbs**

Done for

• French osteotomy

Malunited supracondylar fracture humerus

• Fernandez and Campbell osteotomy

Malunited Colles’fracture

**Lower limbs**

* Salter, Chiari, Pemberton

CDH

* McMurray’s, Shanz

Fracture neck femur

* Pauwels

OA hip

* High tibial osteotomy

OA knee

* Dwyer’s osteotomy

Clubfoot

* Spinal osteotomy

Ankylosing spondylitis

## Arthrodesis

Arthrodesis is fusion of the joints by surgical methods.

Because it limits the function of the joint, arthroplasty it is more commonly used nowadays.

However, it can be used in the following situations:

• Gross destruction of the joints as in rheumatoid arthritis, Charcot’s joints or advanced osteoarthritis.

• Quiescent tubercular arthritis

• Gross instability due to muscle paralysis as in polio.

• For permanent correction of a deformity.

### Methods

There are three methods:

#### Intra-articular Arthrodesis

Here joint is opened, articular cartilage is denuded, cancellous bone grafts are packed, joint is kept in a functional position and either fixed internally or externally by plaster, etc.

**Extra-articular Arthrodesis**

This is indicated in infective condition of the hip, shoulder or spine.

In this, there is no risk of reactivating or spreading the infection as the joint itself is not opened, but bone-to-bone fusion is obtained above or below the joint.

#### Combined Arthrodesis

This is a combination of the above two procedures.

**Note:** Arthrodesis of a joint gives it stability but takes away its mobility. It is

like robbing Peter to pay Paul.

Practical Facts:

Arthrodesis

Each joint should be fixed in its functional position as mentioned below to enable the patient to continue using it:

Joints Functional positions

Upper limbs

Shoulder

30° Abd/30° flexion/40°

internal rotation

Elbow

• Eating hand (right)

• Toilet hand (left)

Wrist

Forearm

MP joint

90° of flexion

70° of flexion

20° dorsiflexion

10° pronation

35° flexion

IP joints 45° flexion

Lower limbs

Hip 15° flexion, no adduction or

abduction or rotation

Knee

• Ankle (men)

• Ankle (women)

Metatarsophalangeal joints of

big toe

20° flexion

90° or neutral position

15–20° of plantar flexion

Slight extension

## Arthroplasty

Arthroplasty is an operation to construct a new mobile joint.

The following are the indications:

• Advanced osteoarthritis or rheumatoid arthritis of hip, knee, shoulder, elbow, hand and foot.

• Quiescent destructive tuberculous arthritis of hip and elbow.

• Fracture neck nonunion in patients of more than 60 years.

• Rarely to correct deformity, e.g. hallux valgus.

### Types

There are three varieties of arthroplasties.

**• Excision arthroplasty:**

Here one or both the articular surfaces are excised; fibrous tissue fills up in the gap thus created and provides mobility.

It is usually done in hip, elbow and metatarsophalangeal joint of the great toe.

**• Hemi-replacement arthroplasty:**

Either of the articulating surface is removed or replaced by prosthesis of similar shape and size,.

**• Total replacement arthroplasty:**

Here both the articular surfaces are excised and replaced by prosthetic components, the larger joint is replaced by a metallic prosthesis, and the smaller joint by high-density polyethylene.

Both the components are fixed by acrylic cement, e.g. total hip replacement for osteoarthritis or rheumatoid hip and partial or total knee replacement for advanced intractable osteoarthritis or rheumatoid arthritis.

## Bone Grafting Operations

Bone grafting is used in the following situations in orthopedic practice:

• To promote union in cases of nonunion or ununited fractures.

• In arthrodesis of joints for intra-articular or extraarticular fusion.

• To fill a defect or cavity in a bone.

### Types

There are three types of bone grafts.

• Autogenous grafts or autografts:

These are bone grafts either cancellous or cortical obtained from different parts of the patient’s own body.

Cancellous bone grafts are obtained from the iliac crest and the cortical bone graft is obtained from the fibula.

Due to improvement in microvascular surgery, it is now possible to obtain a graft with the muscle pedicle with its blood vessel intact and anastomosed to the recipient area, e.g. Meyer’s muscle pedicle graft.

The other method is to obtain a free vascularized graft where the bone graft is taken along with its blood supply, and the blood vessels are anastomosed to the vessels in the recipient area, e.g. fibula with its blood supply intact.

• Allograft or homograft or homogeneous grafts:

Here the bone graft is obtained from another person’s body usually if the requirement is large as in filling up the gap after a tumor resection (e.g. osteoclastoma) and if graft is insufficient from his or her own body.

Allograft is obtained from another person living or dead. The latter is called “cadaveric graft”. These bone grafts are usually used fresh or may be stored under aseptic conditions until required. Cadaveric bone is sterilized either by boiling or by irradiation and stored at –70°C in a bone bank after decalcification and preservation with formalin.

• Xenografting (heterogeneous or heterograft):

Here the bone graft is obtained from animals mainly bovine.

It is sparingly used.

**Artificial bone:**

This is made up of hydroxyapatite and is now being used in some centers.

### Role of a Bone Graft

It provides a scaffold or a temporary bridge upon which a new bone is laid down.

Thus, the bone cells of the graft die and are eventually replaced by a new living bone.

Vascularized grafts are incorporated very rapidly.

## Tendon Surgeries

This includes:

Tendon transfers:

In this operation, the insertion of a healthy functioning muscle is moved to a new site, so that it has a different action. Other intact tendons will take care of the

original function of the transferred tendon.

Indications

• Muscle paralysis as in polio or peripheral nerve injury.

• Muscle imbalance as in cerebral palsy

• In rupture or cut tendon where direct suture is not possible.

Tendon grafting:

In this, a length of free tendon is used to bridge a gap between the severed ends of the recipient

tendon, e.g. reconstruction of flexor tendons severed in the fibrous digital sheaths of the hand.

Free tendon graft is usually obtained from the palmaris longus or from one of the toe extensors at the dorsum of the foot

## Equalization of Leg Length

In patients with unequal leg length as in polio, equalization

of leg length can be obtained by:

• Leg lengthening by llizarov’s technique

• Leg shortening, especially in femur or tibia.

Not advocated as a routine procedure

• Arrest of epiphyseal growth by stapling in children.

**Excision of tumors**: This is discussed in neoplasms.