

Your Practice Online

P R E S E N T S

Ankle Joint Replacement

Multimedia Health Education

Disclaimer

This movie is an educational resource only and should not be used to manage Orthopaedic Health. All decisions about Ankle Joint Replacement must be made in conjunction with your Physician or a licensed healthcare provider.

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MULTIMEDIA HEALTH EDUCATION MANUAL

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INTRODUCTION

Ankle Joint Replacement surgery, also called Total Ankle Arthroplasty, is used to treat the pain and immobility of severe end stage arthritis that has not responded to non-surgical treatments.

In order to learn about ankle joint replacement surgery, it is important to understand the normal anatomy of the ankle.

Introduction

The foot and ankle in the human body work together to provide balance, stability, movement, and propulsion.

This complex anatomy consists of:

- 26 bones
- 33 joints
- Muscles
- Tendons
- Ligaments
- Blood Vessels, Nerves, and Soft Tissue

26 bones

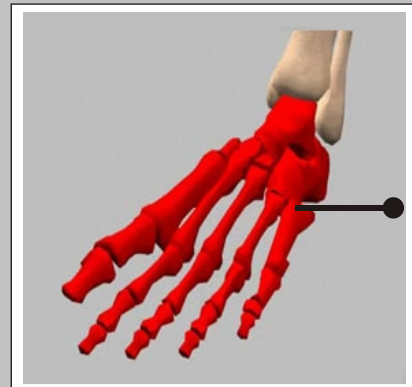
(Refer fig. 1)

33 joints

(Refer fig. 2)

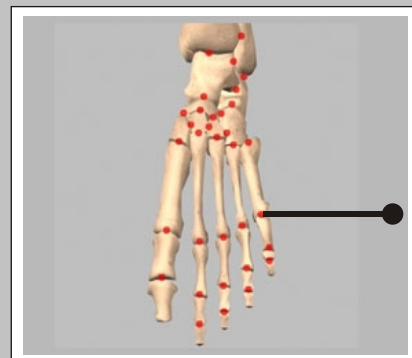
Muscles

(Refer fig. 3)



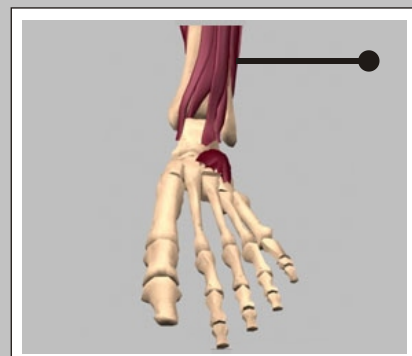
Bones

(Fig. 1)



33 joints

(Fig. 2)



Muscles

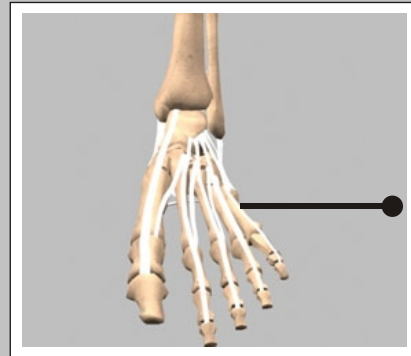
(Fig. 3)

Unit 1:

Introduction

Tendons

(Refer fig. 4)

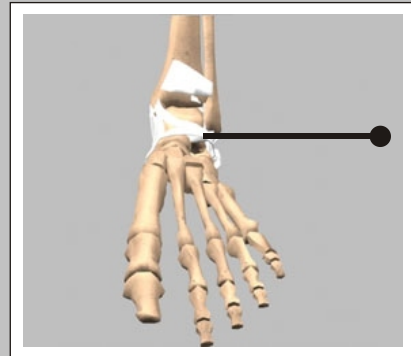


Tendons

(Fig. 4)

Ligaments

(Refer fig. 5)

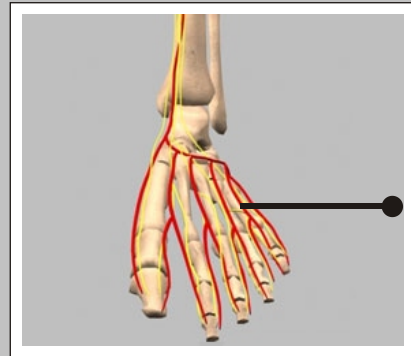


Ligaments

(Fig. 5)

Blood Vessels, Nerves, and Soft Tissue

(Refer fig. 6)



**Blood Vessels,
Nerves, and
Soft Tissue**

(Fig. 6)

Normal Ankle Anatomy

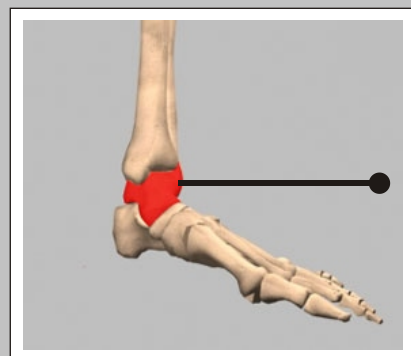
The foot can be divided into three anatomical sections called the hindfoot, midfoot, and forefoot.

Hindfoot

The hindfoot consists of the Talus bone or ankle bone and the calcaneus bone or heel bone.

The calcaneus bone is the largest bone in your foot while the talus bone is the highest bone in your foot.

(Refer fig. 7)



Talus

(Fig. 7)

Unit 1:

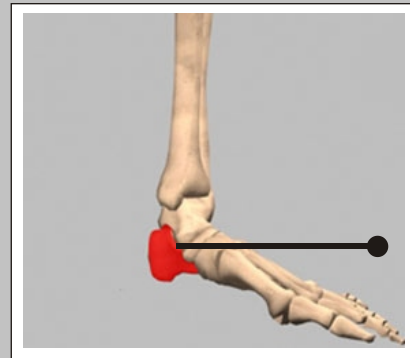
Introduction

Hindfoot

The calcaneus joins the Talus bone at the subtalar joint enabling the foot to rotate at the ankle.

The hindfoot connects the midfoot to the ankle at the transverse tarsal joint.

(Refer fig. 8)



Calcaneous
(Fig. 8)

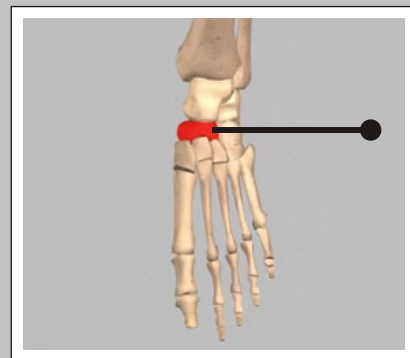
Midfoot

The midfoot contains five tarsal bones: the navicular bone, the cuboid bone, and 3 cuneiform bones. It connects the forefoot to the hindfoot with muscles and ligaments. The main ligament is the plantar fascia ligament.

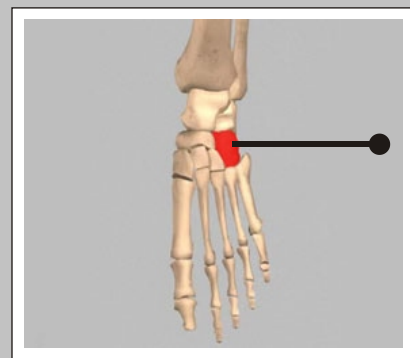
The midfoot is responsible for forming the arches of your feet and acts as a shock absorber when walking or running.

The Midfoot connects to the forefoot at the five tarsometatarsal joints.

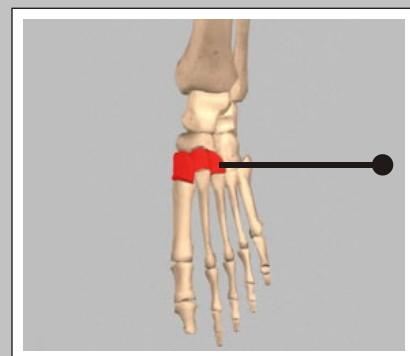
(Refer fig. 9 to 11)



Navicular
(Fig. 9)



Cuboid
(Fig. 10)



**Cuneiform
Bones**
(Fig. 11)

Forefoot

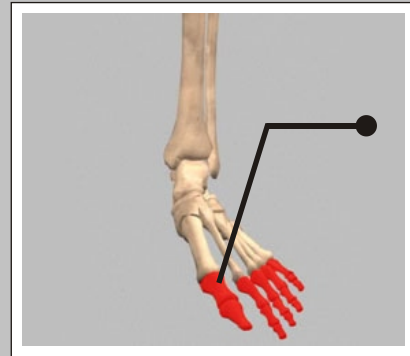
The forefoot consists of your toe bones, called phalanges, and metatarsal bones, the long bones in your feet.

Phalanges connect to metatarsals at the ball of the foot by joints called phalange metatarsal Joints.

Each toe has 3 phalange bones and 2 joints, while the big toe contains two phalange bones, two joints, and two tiny, round sesamoid bones that enable the toe to move up and down. Sesamoid bones are bones that develop inside of a tendon over a bony prominence.

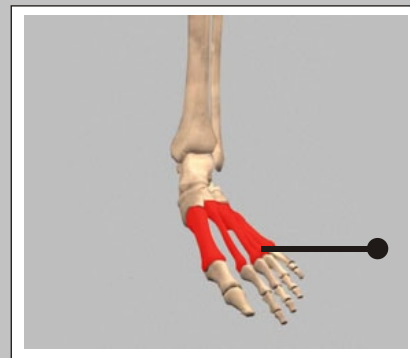
The first metatarsal bone connected to the big toe is the shortest and thickest of the metatarsals and is the location for the attachment of several tendons. This bone is important for its role in propulsion and weight bearing.

(Refer fig. 12 & 13)



Phalanges

(Fig. 12)



Metatarsals

(Fig. 13)

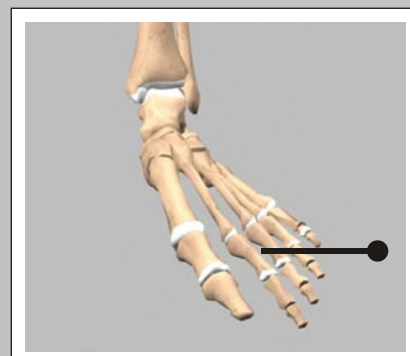
Soft Tissue Anatomy

Our feet and ankle bones are held in place and supported by various soft tissues.

Cartilage

Shiny and smooth, cartilage allows smooth movement where two bones come in contact with each other.

(Refer fig. 14)



Cartilage

(Fig. 14)

Unit 1:

Introduction

Tendons

Tendons are soft tissue that connects muscles to bones to provide support. The Achilles tendon, also called the heel cord, is the largest and strongest tendon in the body. Located on the back of the lower leg it wraps around the calcaneus, or heel bone. When inflamed it causes a very painful condition called Achilles tendonitis and can make walking almost impossible due to the pain.

(Refer fig. 15)

Ligaments

Ligaments are strong rope like tissue that connects bones to other bones and help hold tendons in place providing stability to the joints. The plantar fascia is the longest ligament in the foot, originating at the calcaneus, heel bone, and continuing along the bottom surface of the foot to the forefoot. It is responsible for the arches of the foot and provides shock absorption.

A common cause of heel pain in adults, plantar fasciitis can occur when repetitive micro tears occur in the plantar fascia from overuse.

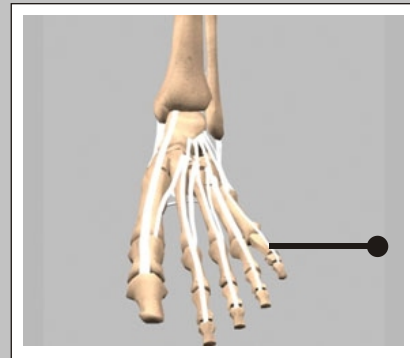
Ankle sprains, the most commonly reported injury to the foot and ankle area, involve ligament strain, and usually occur to the talo-fibular ligament and the calcaneo-fibular ligament.

(Refer fig. 16)

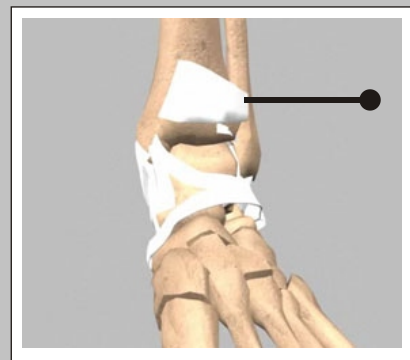
Muscles

Muscles are fibrous tissue capable of contracting to cause body movement. There are 20 muscles in the foot and these are classified as intrinsic or extrinsic. The intrinsic muscles are those located in the foot and are responsible for toe movement. The extrinsic muscles are located outside the foot in the lower leg.

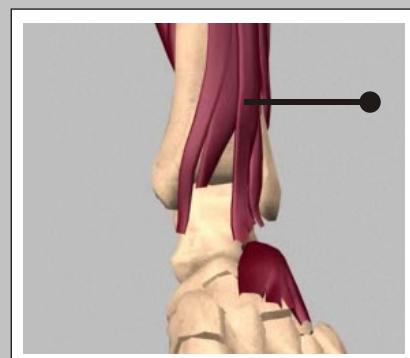
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Tendons
(Fig. 15)



Ligaments
(Fig. 16)



Muscles
(Fig. 17)

Muscles

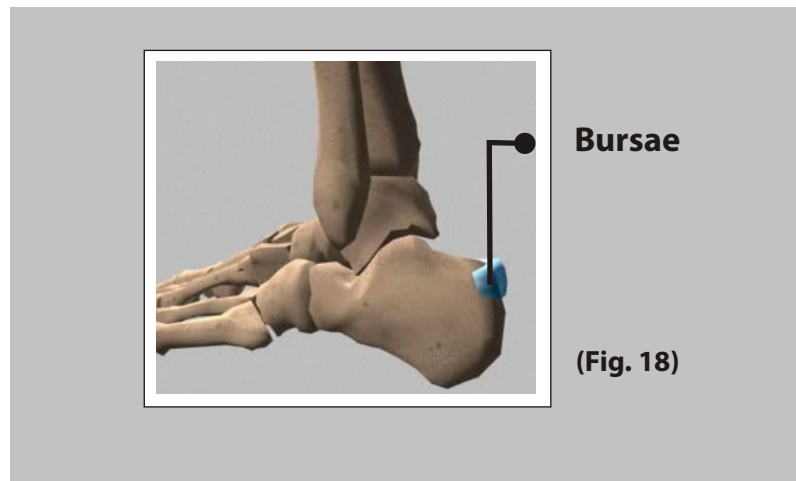
The gastrocnemius or calf muscle is the largest of these and assists with movement of the foot. Muscle strains occur usually from overuse of the muscle in which the muscle is stretched without being properly warmed up.

(Refer fig. 17)

Bursae

Bursae are small fluid filled sacs that decrease friction between tendons and bone or skin. Bursae contain special cells called synovial cells that secrete a lubricating fluid. When this fluid becomes infected, a common painful condition known as Bursitis can develop.

(Refer fig. 18)



Indications

Ankle joint replacement surgery may be recommended by your surgeon for the treatment of severe end stage arthritis that has not responded to conservative treatment options such as medication or injections.

Arthritis is a general term covering numerous conditions where the joint surfaces wear out. The joint surface is covered by a smooth articular surface made of cartilage that allows pain free movement in the joint. This surface can wear out for a number of reasons. Often the definite cause is unknown.

When the articular cartilage wears out, the bone ends rub on one another causing pain. There are numerous conditions that can cause arthritis and often the exact cause is never known.

Causes of arthritis include:

- Inflammatory diseases such as Rheumatoid arthritis
- Wear and tear of the joint can cause osteoarthritis
- Growth abnormalities of the ankle may lead to premature arthritis.
- Trauma (fracture)
- Increased stress from overuse
- Avascular necrosis (loss of blood supply)
- Infection
- Connective tissue disorders

Now see the difference between the normal ankle and the arthritic ankle. To your left, see the normal ankle joint. To your right, an arthritic ankle joint.

(Refer fig. 19 & 20)



**Normal
Ankle Joint**

(Fig. 19)



**Arthritic
Ankle Joint**

(Fig. 20)

In an arthritic ankle:

- The cartilage lining is thinner than normal or completely absent. The degree of cartilage damage and inflammation varies with the type and stage of arthritis.
- The joint capsule of the arthritic ankle is swollen
- The joint space is narrowed and irregular in outline; this can be seen in an X-ray image.
- Bone spurs or excessive bone can also build up around the edges of the joint.

Other indications for ankle joint replacement surgery include:

- Severe ankle fracture in older patients with osteoporosis, a disease that causes bone loss and raises the risk of increased fractures.
- Tumor or growth in the ankle joint
- History of previous ankle surgery

Ankle joint replacement surgery is not appropriate in all cases of ankle arthritis. Ankle fusion may be a better option in some cases. Your surgeon will discuss the best options for you based on your particular situation.

Diagnosis

Ankle conditions should be evaluated by a Foot and Ankle Orthopaedic surgeon for proper diagnosis and treatment.

Your surgeon will perform the following:

- Medical History
- Physical Examination

X-rays

A form of electromagnetic radiation that is used to take pictures of bones.

(Refer fig. 21)



X-rays

(Fig. 21)

Doppler Test

A non-invasive test to assess for adequate blood flow to the ankle prior to surgery. Adequate blood flow is necessary to ensure proper healing post surgery.

MRI

Magnetic and radio waves are used to create a computer image of soft tissue such as nerves and Ligaments.

(Refer fig. 22)



MRI

(Fig. 22)

Ankle Joint Replacement - Introduction

Ankle joint replacement surgery is an option that your surgeon may recommend if your overall health is good and you have not had success with conservative treatment options to relieve your arthritic pain and decreased mobility.

The goal of ankle joint replacement surgery is to eliminate your pain and increase the mobility of your ankle joint.

Surgical Treatment

Ankle joint replacement surgery is performed under sterile conditions in the operating room under general or regional anesthesia.

Your surgeon will perform the following:

An incision is made over the front of the ankle.

The muscles are retracted and tendons and ligaments are moved away to expose the ankle joint. Care is taken with nerves to prevent nerve damage.

The leg bones are then separated from the talus bone.

The damaged joint surfaces of the tibia and fibula are cut off with a surgical saw to allow for a smooth surface for which to attach the tibial component of the implant.

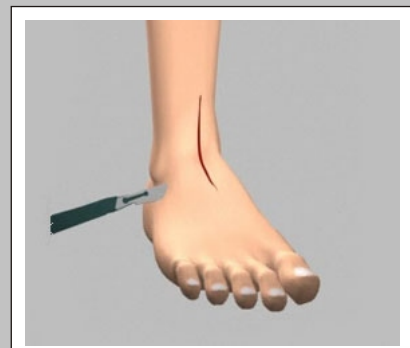
Next, your surgeon will cut the top of the talus bone for insertion of the talar component of the prosthesis.

The tibia and talus bones are then prepared with or without cement, depending on the surgeon's preference.

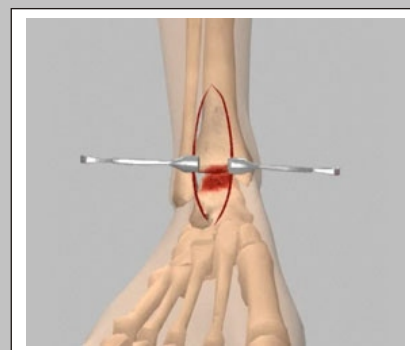
The components are then inserted and put together ensuring proper movement of the prosthesis.

Screws are inserted above the artificial joint between the tibia and fibula to ensure a tight fit of the new prosthesis.

(Refer fig. 23 & 28)



(Fig. 23)



(Fig. 24)

Unit 3:

Surgical Procedure

Surgical Treatment

A bone graft is taken from the portion of bone cut off and is inserted between the tibia and fibula to create a fusion of the two bones. This helps to prevent loosening of the prosthesis.

With all the new components the ankle joint is tested through its range of motion.

The surgeon then irrigates the new joint with sterile saline solution.

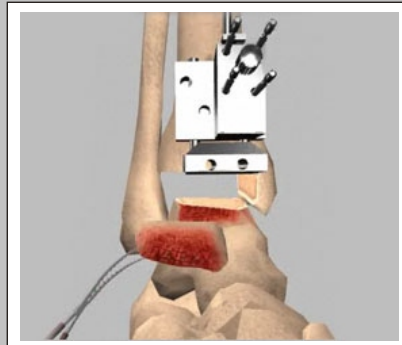
The surgeon then sutures the joint capsule together, repairs the muscles and tendons and sutures the skin closed usually with a drain in place to help any blood drain from the area.

The ankle is then dressed and bandaged and placed in a splint.

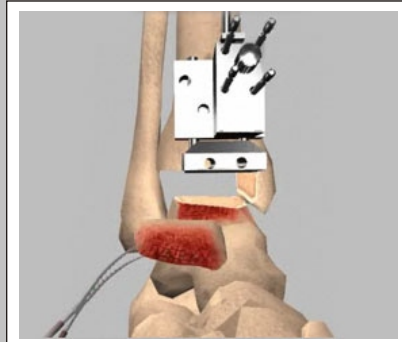
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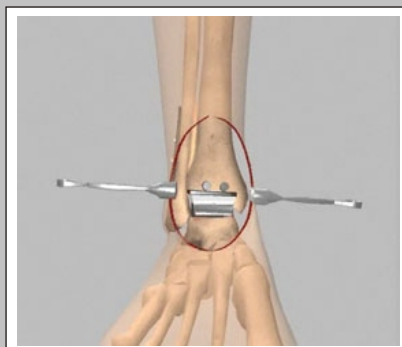
(Fig. 25)



(Fig. 26)



(Fig. 27)



(Fig. 28)



(Fig. 28)

Post Operative Care

After surgery your surgeon will give you guidelines to follow depending on the type of repair performed and the surgeon's preference.

Common Post-operative guidelines include:

- You will probably stay in the hospital 4-5 days after the surgery.
- Your pain will be managed with a PCA machine, injections, or pain pills. A PCA machine, patient controlled analgesia, enables the patient to push a button to deliver a dose of pain medicine through their IV.
- Your ankle will be immobilized in a splint with a bulky dressing.
- You may have a drain tube present to allow blood to drain from the incision. This will usually be removed after 1 or 2 days.
- Elevating the ankle on a pillow above heart level and applying ice packs over the dressing will help reduce swelling and discomfort.
- You will not be able to put weight on your new ankle for 6 weeks and will use either a walker or crutches to ambulate during this time.
- Physical Therapy (PT) will begin soon after surgery and continue for about 3 months to regain full range of motion of the ankle joint.
- Sutures will usually be removed after 10-14 days.
- Keep the incisions clean and dry. You may shower once the dressings are removed unless otherwise directed by your surgeon.
- You will be given specific instructions regarding activity and rehabilitation.
- Eating a healthy diet and not smoking will promote healing.

Risks and Complications

As with any major surgery there are potential risks involved. The decision to proceed with the surgery is made because the advantages of surgery outweigh the potential disadvantages.

It is important that you are informed of these risks before the surgery takes place.

Complications can be medical (general) or specific to ankle surgery.

Medical complications include those of the anesthetic and your general well being. Almost any medical condition can occur so this list is not complete. Complications include:

- Allergic reactions to medications
- Blood loss requiring transfusion with its low risk of disease transmission
- Heart attacks, strokes, kidney failure, pneumonia, bladder infections
- Complications from nerve blocks such as infection or nerve damage
- Serious medical problems can lead to ongoing health concerns, prolonged hospitalization, or rarely death.

Risks and Complications

The majority of patients suffer no complications following Ankle Joint Replacement, however, complications can occur following ankle surgery and include

Infection:

Infection can occur with any operation. In the ankle, infection can be superficial at the incision or deep into the joint cavity. Infection rates vary; if it occurs it can be treated with antibiotics but may require further surgery. Very rarely your ankle joint may need to be removed to eradicate infection.

Fractures (break) of the tibia or fibula bone:

This is also rare but can occur during or after surgery. This may prolong your recovery, or require further surgery.

Dislocation of the ankle:

Also rare, but can occur and require further surgery.

Damage to nerves or blood vessels:

Also rare but can lead to weakness or loss of sensation in part of the foot. Damage to blood vessels may require further surgery if bleeding is ongoing.

Blood clots (Deep Venous Thrombosis):

These can form in the calf muscles and can travel to the lung (Pulmonary embolism). These can be serious and even life threatening.

Loosening of artificial components:

Artificial components can loosen over time causing pain and require another surgery. This is more prevalent in the younger more active population.

Wound irritation:

Your scar can be sensitive or have a surrounding area of numbness. This normally decreases over time and does not lead to any problems with your new joint. Occasionally you can get a reaction to the sutures or a wound breakdown that may require antibiotics or rarely further surgery.

Wear:

All joints eventually wear out. The more active you are, the quicker this will occur.

Failure to relieve pain:

This is rare but may occur especially if some pain is coming from other areas.

Scar tissue build-up requiring revision surgery:

Instability, stiffness, or weakness of the new ankle joint:

Unsightly or thickened scar:

Discuss your concerns thoroughly with your Orthopaedic surgeon prior to surgery.

Risk factors that can negatively affect adequate healing after surgery include:



(Fig. 30)

Disclaimer

Although every effort is made to educate you on Ankle Joint Replacement, there will be specific information that will not be discussed. Talk to your doctor or health care provider about any questions you may have.

You must not proceed until you are confident that you understand this procedure, particularly, the complications.

YOUR SURGERY DATE

READ YOUR BOOK AND MATERIAL

VIEW YOUR VIDEO / CD / DVD / WEBSITE

PRE - HABILITATION

ARRANGE FOR BLOOD

MEDICAL CHECK UP

ADVANCE MEDICAL DIRECTIVE

PRE - ADMISSION TESTING

FAMILY SUPPORT REVIEW

Physician's Name : _____

Patient's Name : _____

Physician's Signature: _____

Patient's Signature: _____

Date : _____

Date : _____