CASE PRESENTATION: POORLY MANAGED FRACTURE FEMUR~ NON UNION OR MALUNITED FRACTURE FEMUR.

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OUTLINE Clinical presentation Highlights/Overview

CLINICAL PRESENTATION

BIODATA

- NAME: L. T.
- AGE: 55y/o
- SEX:Male
- OCCUPATION: MECHANICAL ENGINEER
- ADDRESS: 125, Monica Road, Adiyan Gasline Agbado
- RELIGION: Muslim
- ETHNIC GROUP: Yoruba
- INFORMATION: Patient (Reliable)
- DATE OF PRESENTATION TO FACILITY: 14/05/2025

PRESENTING COMPLAINTS

- Inability to walk $\times 11/12$
- Abnormal mobility Lt thigh \times 11/12

HISTORY OF PRESENTING COMPLAINTS

- Patient said he sustained injury to the Lt thigh 11/12 ago (05/6/2024) following motorcycle road traffic accident. He was a passenger on a motorcycle that was involved in road traffic accident at Agege.
- He was taken to Orile Agege General Hospital where he was confirmed of broken Lt thigh Bone.
- Surgery was suggested, but he was taken away for management by a traditional bone setter.
- He was treated for about 4months and discharged by the traditional bone setter. But when he couldn't walk he sought further treatment from another traditional bone setter who is still managing the patient till the time of presentation in our facility.

PAST MEDICAL HISTORY

- Nil hypertensive, nil diabetic, nil PUDx
- Nil blood transfusion
- Nil previous surgery

EXAMINATION FINDINGS

- GENERAL EXAMINATION
- Male, adult, ambulate with bilateral axillary crutches and non weight bearing on Lt lower limb
- Not pale, anicteric, acynosed, not dehydrated, no finger clubbing and no pedal oedema

MUSCULOSKELETAL

- Lt lower limb- thigh dressed in bandages support with sticks.
- Abnormal mobility mid Left thigh
- Muscle wasting: Lt thigh
- Quadriceps: Rt; 49cm Lt; 37cm
- Shortening Lt lower limb:
- full length: RtLL;91cm, LtLL;86cm
- Femoral length: Rt Femur; 46cm. Lt femur; 44cm
- Stiffness Lt knee
- No neurological deficit

OTHER EXAMINATION FINDINGS

Not remarkably contributory

ASSESSMENT

NON UNION FRACTURE MID SHAFT LEFT FEMUR 2°

- 1. POORLY MANAGED FRACTURE FEMUR BY TBS
- 2. MOTORCYCLE ROAD TRAFFIC ACCIDENT

HIGHLIGHTS/OVERVIEW

Definition

Aetiology

Types of Non union fracture

Clinical presentation

Diagnosis & Investigation

Management

Prognosis & Rehabilitation

DEFINITION

- A non-union fracture of the femur is a condition where a fracture in the femur (thigh bone) fails to heal properly over an extended period, typically lasting longer than 9 months despite appropriate treatment. Essentially, the broken ends of the bone do not unite or fuse together as they should, leading to persistent instability, pain, and functional impairment.
- Approximately 5% of all long bone fractures will result in nonunions and even more in delayed unions.



AETIOLOGY

- Fracture types
- Mechanical instability
- Poor blood supply
- Injudicious intervention by traditional bone setters
- Neglected fracture
- Infection
- Patient factor

FRACTURE TYPES

• Complex fractures, comminuted fractures (where the bone breaks into many pieces), or fractures with bone loss are more prone to delayed healing.



MECHANICAL INSTABILITY

- If the bone fragments are not held stable enough, the healing process is disrupted.
- Movement between the fractured bone ends can interfere with the healing process, hindering the formation of new bone.
- Large displacement of the fracture fragments indicates a lack of adequate stability, leading to relative movement and potentially nonunion or poor union.



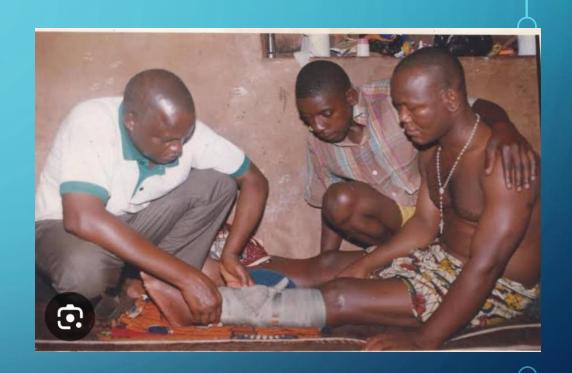
POOR BLOOD SUPPLY

- Reduced blood flow to the fracture site can hinder the delivery of essential nutrients and growth factors needed for bone healing, leading to impaired healing and nonunion.
- Direct Injury to Blood Vessels: High-energy injuries, open fractures, and severe soft tissue damage can directly injure blood vessels supplying the bone, leading to inadequate blood flow to the fracture site.



INJUDICIOUS INTERVENTION BY TBS

- In Nigeria, traditional bone setters, also known as "TBS," are locally trained individuals who provide primary healthcare, particularly for musculoskeletal injuries. They often employ techniques like massage, herbal remedies, and splints to treat dislocations, fractures, and offer rehabilitation, with a significant number of patients in Nigeria first seeking their services.
- While TBS are a common choice, their services are also associated with potential complications like malunion or non-union of fractures, infection, and gangrene.



NEGLECTED FRACTURES

- A neglected fracture is a fracture that is not properly addressed, resulting in a delayed or incorrect treatment and potentially worsening the condition or even causing disability.
- This can occur due to various reasons, including delayed medical attention, financial constraints, limited access to healthcare, or underestimation of the injury's severity.



INFECTION

- Infection at the fracture site can significantly hinder healing.
- The infection, often bacterial, hinders the natural bone healing process, resulting in a gap or nonunion between the fractured bone fragments.
- Pus or drainage from the wound is a clear sign of infection.



PATIENT FACTOR

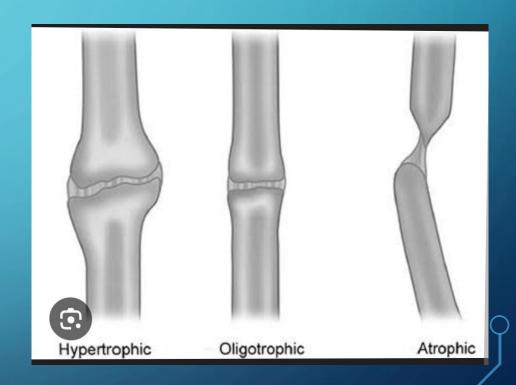
- Several patient-related factors can contribute to a fracture nonunion, which is when a broken bone fails to heal properly. These factors often relate to systemic health conditions and lifestyle habits that impact bone healing leading to non union fracture.
- Age, obesity, smoking, diabetes, poor nutrition, osteoporosis, hypothyroidism, pre-existing infection, and certain medications can negatively impact bone healing.





TYPES OF NON-UNION FRACTURE

- Nonunited fractures form three types of pseudoarthrosis:
 - Hypertrophic nonunion: Abundant callus formation but no bone union.
 - Oligotrophic nonunion: Reduced callus but some vascularity.
 - Atrophic nonunion: No callus formation, poor vascularity.



CLINICAL PRESENTATION

- The clinical presentation of a nonunion fracture of the femur is primarily characterized by persistent pain, functional limitation, and often, evidence of continued instability at the fracture site, long after the expected healing period.
- Patients present with the following symptoms:
 - Persistent deep, chronic pain
 - Swollen and skin discoloration at the fracture site
 - Pain with Weight-Bearing/Ambulation
 - Weakness or limited mobility
 - Visible deformity
 - Movement at the fracture site
 - Discharge from the fracture site

CLINICAL PRESENTATION

- **Associated Findings on Physical Examination:**
 - Tenderness and Swelling: The area around the fracture site may remain tender to the touch, and swollen.
 - Discomfort with Active or Passive Range of Motion: Moving the hip or thigh, even passively by the examiner, can elicit pain.
 - Limb discrepancy: In cases of displaced femoral shaft fractures that have gone on to nonunion, the affected thigh may appear shortened, abducted (moved away from the body)
 - Signs of Infection: While not always present, infection can be a cause of nonunion.

 Therefore, the clinician must look for signs such as draining sinus tracts or purulence (pus) at any fracture or surgical incision sites
 - Neurovascular Assessment: A thorough neurovascular exam is crucial to assess for any nerve damage (numbness, tingling sensation, muscle weakness) or compromised blood supply.

DIAGNOSIS & INVESTIGATION

- Diagnosis of Non-Union Fracture Femur involves a combination of clinical evaluation, imaging studies, and sometimes laboratory tests.
 - Imaging Studies: These are crucial for confirming the diagnosis and assessing the characteristics of the non-union.
 - * X-rays (Plain Radiographs): AP,LAT, Oblique
 - * Initial imaging, providing basic information about the fracture.
 - * Look for a persistent fracture line with no bridging callus across the fracture gap.
 - * May show sclerotic (hardened) bone edges, indicating a lack of healing.
 - * Comparison with serial X-rays over several months is essential to demonstrate a lack of progressive healing.

DIAGNOSIS & INVESTIGATION

- Computed Tomography (CT) Scans
 - * Provide more detailed, 3D visualization of the fracture fragments, bone loss, and the extent of non-union
 - * Excellent for assessing cortical bridging and the presence of a fracture gap.
 - * Useful for surgical planning.
 - Magnetic Resonance Imaging (MRI
 - * Provides excellent soft tissue contrast
 - * Can assess surrounding soft tissue damage, muscle atrophy, and potential infection
 - Bone Scans (Scintigraphy):
 - * May be used to assess metabolic activity at the fracture site.

DIAGNOSIS & INVESTIGATION

- Once a non-union fracture is suspected or diagnosed, further investigations are often performed to identify the underlying cause and guide treatment.
- Laboratory Studies (Blood Tests): These are essential to rule out systemic factors that can impede bone healing.
- 1. Full blood count: To check for signs of infection (elevated white blood cell count) or anemia.
- 2. Erythrocyte sedimentation rate & C-reactive protein: These are inflammatory markers that, if elevated, can suggest the presence of an infection at the fracture site.
- 3. Blood culture & Aspiration of the fracture site: To identify systemic infection and obtain fluid for gram stain, culture, and sensitivity to identify infection and guide antibiotic treatment.
- 4. Nutritional markers: Vit.D, Calc. & Phosphate, Albumin, TSH & PTH, HbA1c(to assess nutritional status,bone metabolism and Glycemic control)
- 5. Blood grouping and Cross-matching, HCV, HbsAg, HIV 1&2

MANAGEMENT

- Treating a nonunion fracture of the femur (thigh bone) is a complex process that often requires a combination of approaches i.e surgical(operative) & Non surgical
- The treatment strategy depends on various factors, including the type of nonunion (hypertrophic, oligotrophic, or atrophic), the location of the fracture, the patient's overall health, and any underlying causes.
 - Surgical Interventions: most common and often necessary for femoral nonunions fracture
 - Debridement: Removing dead tissue or infected material.
 - Bone grafting: Using bone from another part of the body (autograft) or a donor (allograft) to stimulate bone regeneration, and Bone Graft Substitutes can be used as alternatives to bone grafts.
 - Open reduction and internal fixation (ORIF): Restoring the fracture alignment and stabilizing it with plates, screws, rods, or prosthetic implant.
 - Intramedullary nailing: Placing a rod inside the bone canal for fixation and potentially dynamization.
 - External fixation: Using pins and a frame to stabilize the fracture.
 - Limb Lengthening Surgery: If there's a significant limb length discrepancy due to the nonunion, lengthening procedures might be considered after the nonunion has healed.

MANAGEMENT

Non-surgical Options:

• Electrical stimulation: Using low-intensity electrical currents to promote bone

healing. They are placed on the skin over the nonunion for a period each day.

- Growth factors:injections of stem cells or platelet-rich plasma (PRP) might be used to stimulate bone regeneration, healing and growth.
- Medications: To assess underlying conditions like infection or osteoporosis.
- Bracing/Orthoses: A brace, splint, or cast can help immobilize the bone.
- Teriparatide: This medication, a form of parathyroid hormone, has shown promise in some cases, particularly for atrophic nonunions, by promoting bone formation.

PROGNOSIS & REHABILITATION

Both non-surgical and surgical treatments for femoral nonunions have high success rates when appropriately applied. However, healing and rehabilitation can take significant time. Physical therapy is almost always a crucial part of the recovery process to restore strength, range of motion, and function.

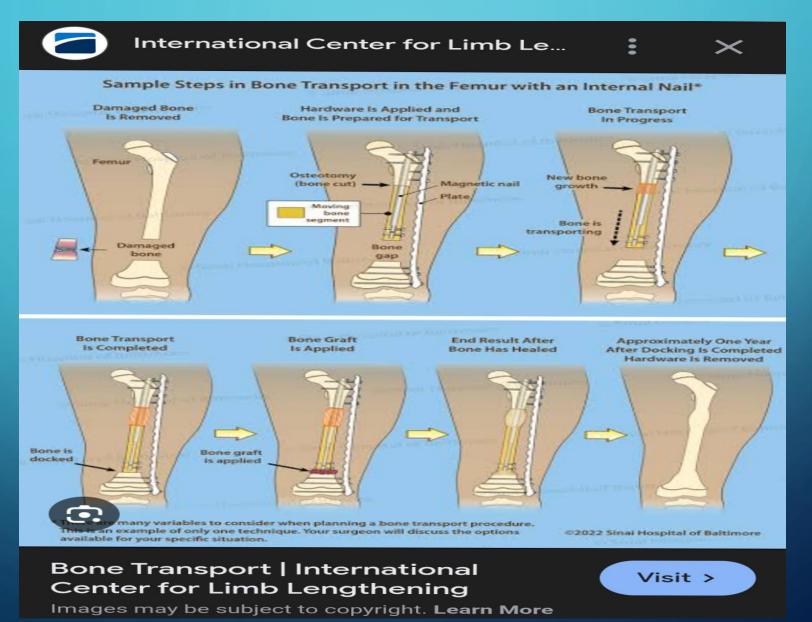
Patients may need to use assistive devices like crutches or walkers(frames) during their recovery.

With appropriate treatment and adherence to postoperative instructions, many patients can achieve successful union and regain full function.

DEBRIDEMENT



BONE GRAFTING

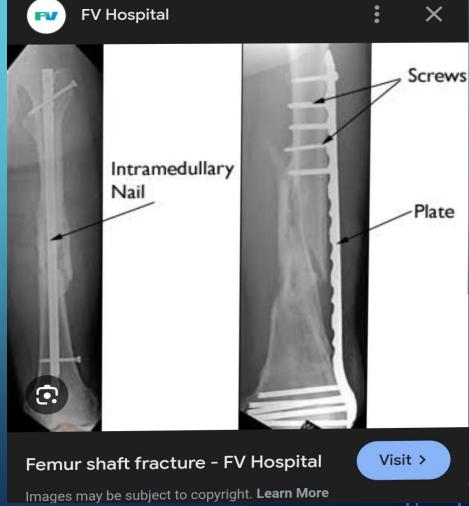


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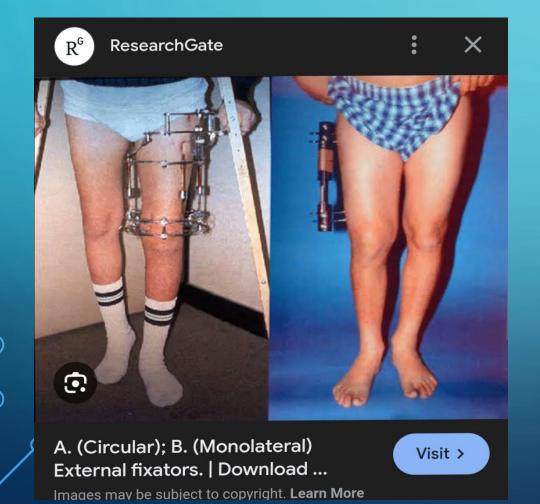


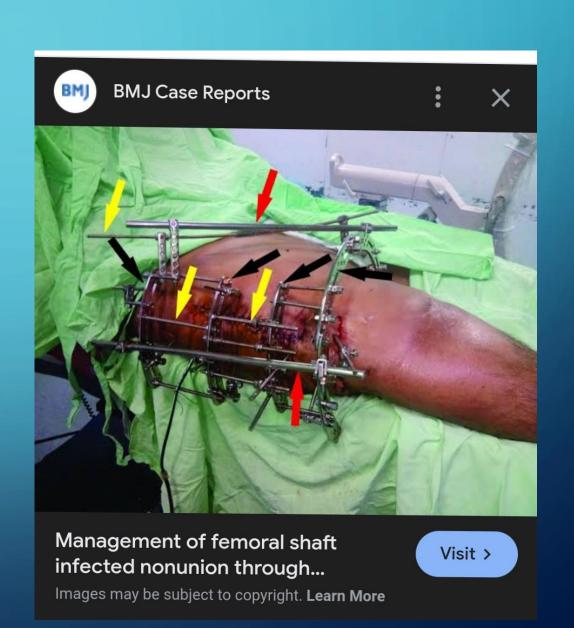
OPEN REDUCTION INTERNAL FIXATION





EXTERNAL FIXATION





LIMB LENGTHENING

LIMB LENGTHENING

Limb lengthening surgery is a procedure that gradually makes an arm or leg bone longer. This procedure treats skeletal dysplasia, bone growth issues and bone length differences.



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Cleveland Clinic X Limb Lengthening Surgery Limb lengthening device (internal rod) Osteotomy New bone Tibia Fibula 2 months 3 months 6 months **Bone** Consolidation Bone distraction phase hardening phase Rod removal Cleveland Clinic @2022 **Limb Lengthening Surgery:** Visit > **Procedure, Process & Recovery**

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THANK YOU

COMMENTS, QUESTIONS AND ANSWERS

