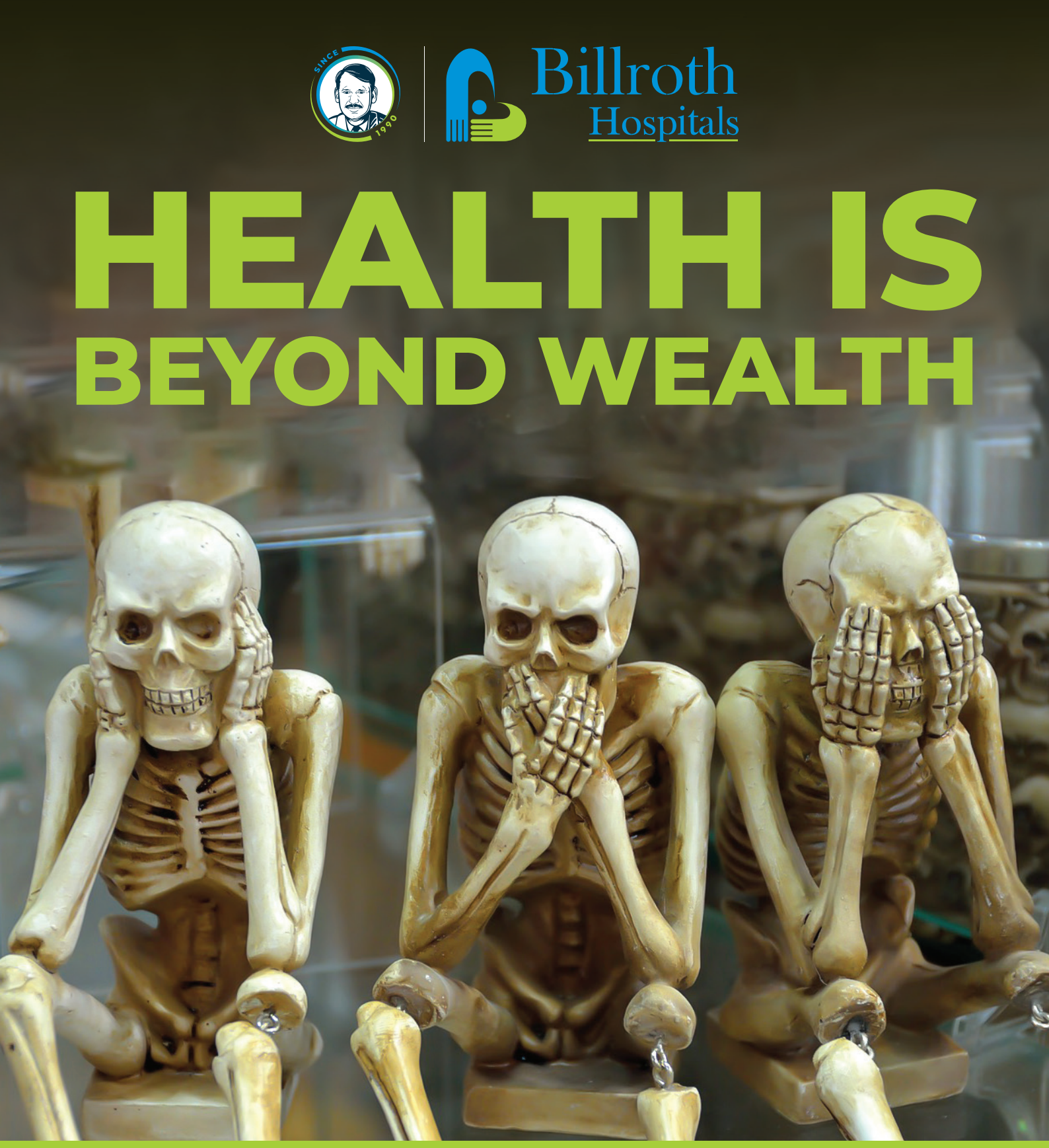
Billroth Hospitals

HEALTH IS BEYOND WEALTH



VOLUME-04

INSIGHTS OF SPINE & BONES

MAN WITH VISION...

Dr. V. Jeganathan
Founder, Billroth Hospitals

"It has been said that a gentle word, a warm hand, a willing ear and small acts of kindness, often taken for granted, can change a life. We believe that to be true. Because we have seen first-hand the power of caring with compassion."

~ Dr. V. Jeganathan - Founder

An extraordinary physician of our times, Dr. V. Jeganathan watched thoughtfully as the first bricks for his dream hospital were laid. His vision for creating a world-class healing environment which would attract the best medical minds was taking shape. He dreamt of creating an institution which would serve as a beacon of hope to patients from across the world, offering them the highest standards of excellence in medical care, delivered with compassion. And so began a journey that started with a 70-bed hospital for Gastroenterology. Now Billroth Hospitals, offers entire spectrum of Cancer Care and elevates cancer treatments through Medical, Surgical and Radiation Oncology.

SINCE 1990, THERE WERE NO COMPROMISES AND NO LOOKING BACK AT BILLROTH HOSPITALS.

Ready to Care

EVERYWAY EVERYDAY

“BRINGING MOVEMENT AND COMFORT BACK TO YOUR LIFE”

The orthopaedic department at Billroth Hospital is a specialized unit dedicated to providing comprehensive care for patients with musculoskeletal conditions. Our team of highly skilled orthopaedic surgeons, nurses, and support staff work together to deliver personalized treatment plans and ensure the best possible outcomes for our patients.

At Billroth Hospital, we offer a wide range of orthopaedic services, including diagnosis, treatment, and rehabilitation for various orthopaedic conditions. The most important supporting services for orthopaedics include a well-equipped emergency room, a radiology department with up-to-date imaging equipment, a modern ultraclean operation theater, and a dynamic physiotherapy department. From fractures and sports injuries to joint replacements and spine surgeries, our department is equipped with state-of-the-art facilities and advanced technology to deliver the highest quality of care. In order to treat old patients with multiple co-morbidities, the hospital has a well-equipped ICU and the 24/7 availability of a critical care team comprising intensivists and other specialists.

The consultants in the department have many years of clinical experience, having trained abroad. We are experienced in performing both minimally invasive and complex surgeries. They work closely with our dedicated team of physiotherapists and rehabilitation specialists to provide comprehensive post-operative care and help patients regain their mobility and functionality.

So far, we have done over 20,000 fracture surgeries, over 5000 joint replacements, over 4000 arthroscopic surgeries, and over 3000 spine surgeries in our department.

In addition to surgical interventions, our department also focuses on non-surgical treatment options such as physical therapy, pain management, and orthotics. We believe in a holistic approach to orthopaedic care, tailoring treatment plans to meet the unique needs of each patient.

At Billroth Hospital, patient satisfaction and safety are our top priorities. We strive to create a warm and friendly environment, ensuring that our patients feel comfortable and well-informed throughout their treatment journey. Our dedicated staff is always available to address any concerns or questions that patients may have.

In summary, the orthopaedic department at Billroth Hospital is committed to providing exceptional orthopaedic care, utilizing the latest advancements in medical technology and a patient-centered approach. We aim to improve the quality of life for our patients by delivering comprehensive and compassionate care for all their orthopaedic needs.

DR. A. DORAIRAJAN MS D. *ORTH, DNB ORTH, FRCS (GLAS), MSC ORTH (UK)*

SENIOR CONSULTANT ORTHOPAEDIC SURGEON

DO YOU HAVE THE BONES?

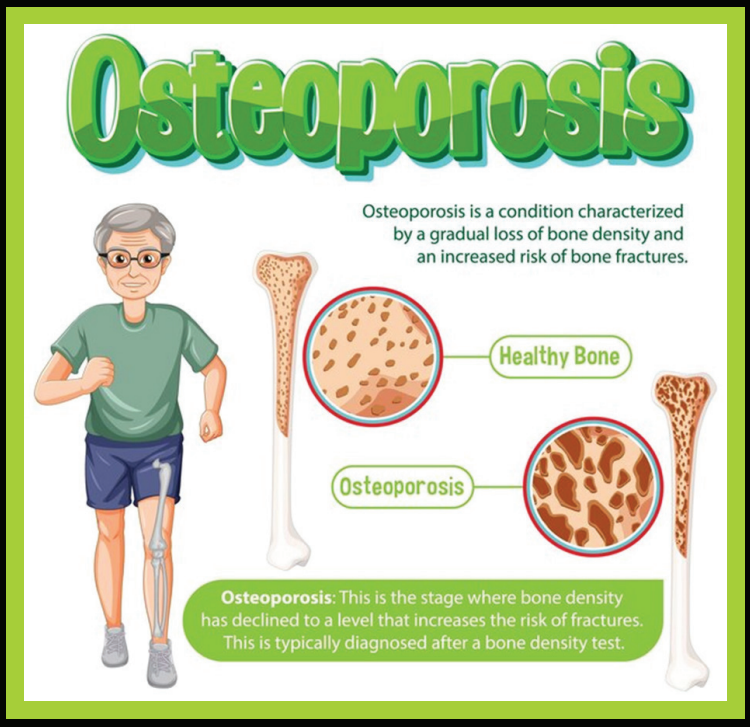
As we age, so do our bodies...

KNOW YOUR BONES!! IT COULD SAVE YOUR LIFE.

Wrinkles appear. Aches and pains pop up. Hair starts to grow in strange places, and falls out in others. We begin noticing we're not as energetic or strong as we once were.

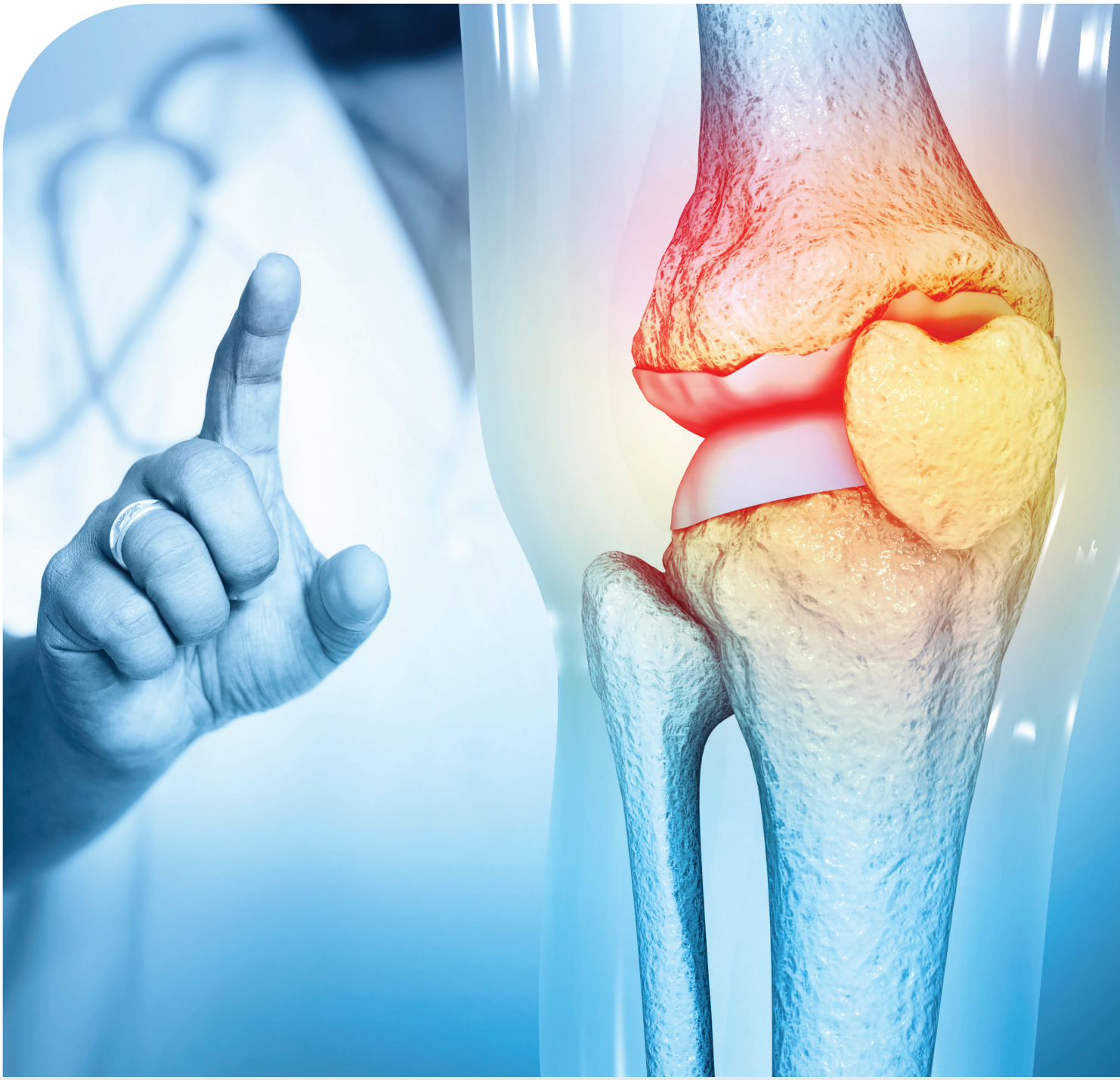
Internal changes are happening too – and one of the most important ones concerns our bones. We lose bone strength as we age, and this puts us at risk of developing osteoporosis.

Often called the 'silent disease', osteoporosis occurs without any symptoms. In fact, many people only become aware that there's an issue with their bones when they break one. One in three women and one in five men will suffer from an osteoporotic fracture in their lifetime.



11 WAYS TO KEEP YOUR BONES HEALTHY

- Eat Your Veggies • Do Strength Training and Weight-Bearing Exercises
- Consume Enough Protein • Eat High-Calcium Foods • Get Plenty of Vitamin's D and K
- Avoid Very Low-Calorie Diets • Consider Collagen • Maintain a Stable, Healthy Weight
- Eat Foods High in Magnesium and Zinc • Eat Foods High in Omega-3 Fats
- Cut back on alcohol & smoking



KNOW YOUR SPINE...

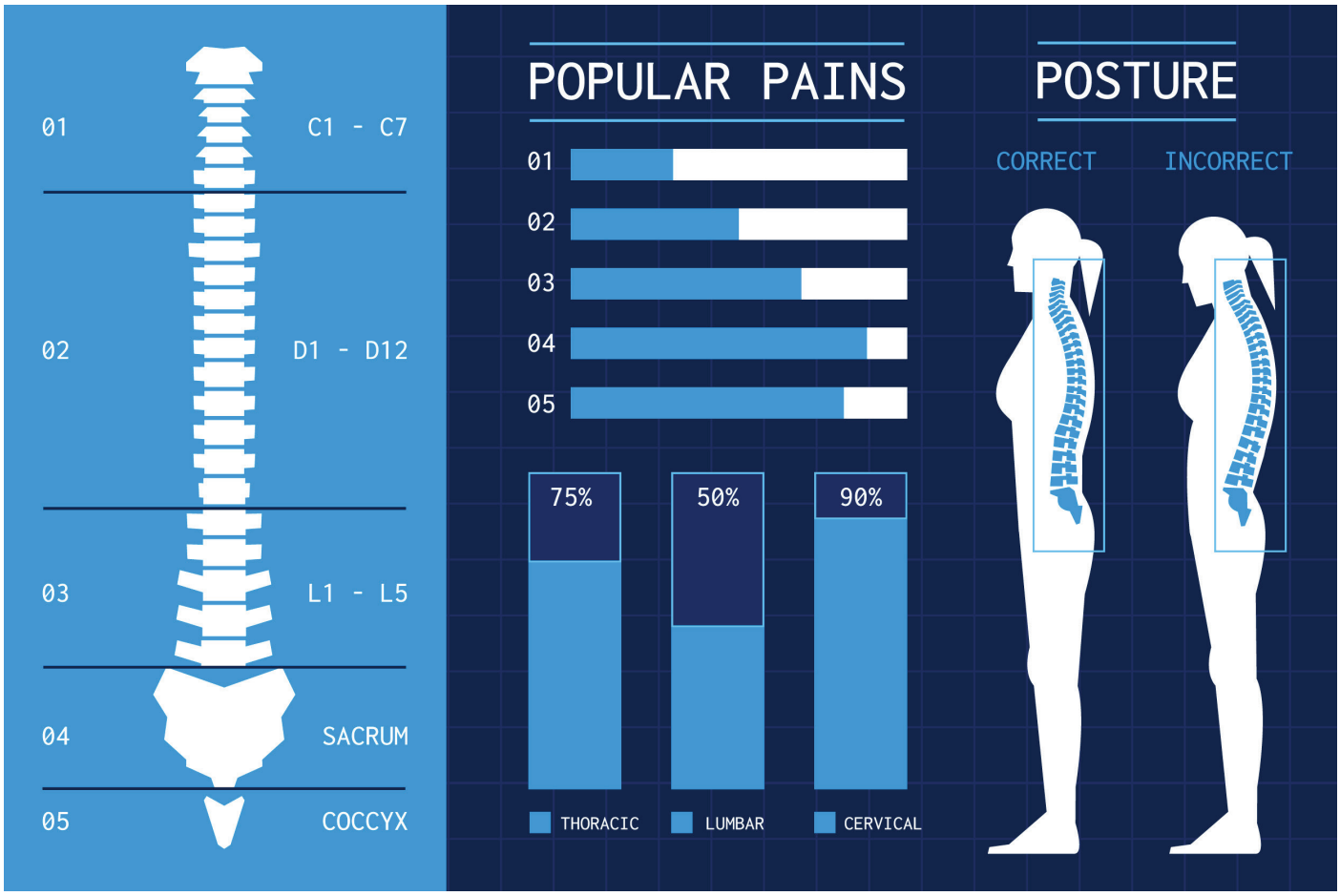
TO UNDERSTAND SPINAL INJURY, AILMENTS AND TREATMENT, WE MUST FIRST UNDERSTAND OUR SPINE

The spine is one of the most important structures in the human body, supporting much of your weight and protecting the spinal cord, the delicate nervous tissue which carries communication from the brain to the rest of the body. The spine is a strong but flexible column, allowing a wide range of movement.

All about vertebrae

The spine extends from the base of the skull to the tailbone and is made up of thirty-three bones known as the vertebrae. The first seven vertebrae (cervical vertebrae) are in the neck and are numbered 'C'1 through 'C'7. Nerve compression in this area can cause neck pain, which may radiate down the arms to the hands and fingers. The next twelve vertebrae make up the thoracic region ('T'1 through 'T'12); the ribs attach to these vertebrae and protect the heart and lungs.

The lumbar region is the lower back, which contains five vertebrae ('L'1 through 'L'5). It plays a significant role in motion and flexibility. It is the source of most motion and supports most of the body weight. Overload or taxing movements may strain the structure, compress the nerves and cause back pain, which may radiate down the legs to the feet.



The regions beneath the lumbar spine are the sacrum ('S'1 through 'S'5) and coccyx (a series of small bones often called the tailbone). These are fused; they do not have discs between them.

CURIOUS FACTS ABOUT BONES

Bones are amazing. People are often surprised to learn that bone is a living tissue. It is widely understood that our bones have the ability to repair themselves after breaks and fractures. But they are also constantly removing and rebuilding themselves in response to everyday activity, in a cellular process that we call remodelling.

Here are some other facts about the skeleton.

1. Not everyone has 206 bones
2. The human skeleton is constantly changing in height
3. Only one bone is not connected to another bone
4. Bone marrow isn't just space filler
5. The smallest bones are in the ear
6. Bones cause you stress

CASE REPORT: 01

Complex Revision Hip Surgery Using a Custom-made 3D Implant

Primary total hip arthroplasty (THA) is widely recognized as a successful surgical intervention that is associated with high quality-adjusted life years (QALYs). Despite the success of this procedure, a number of hip arthroplasties eventually require revision (10–15%) after some time.

The most common causes of revision are aseptic loosening, instability, and periprosthetic joint infection, each of which can lead to mild or advanced acetabular bone loss. The successful management of complex acetabular defects and pelvic discontinuities requires accurate surgical planning, specific operative techniques, and highly specialized implant design and tools. In the past, several methods of addressing the bone defect had not yielded a good outcome due to the improper size and design of the revision implants. Recently, custom-made 3D-printed titanium cups enable surgeons to treat traditionally unreconstructible massive acetabular defects and thereby restore the ability of patients to walk.

Our case exemplifies the use of new 3D printing technology in the management of complex hip revisions with acetabular bone deficiency.

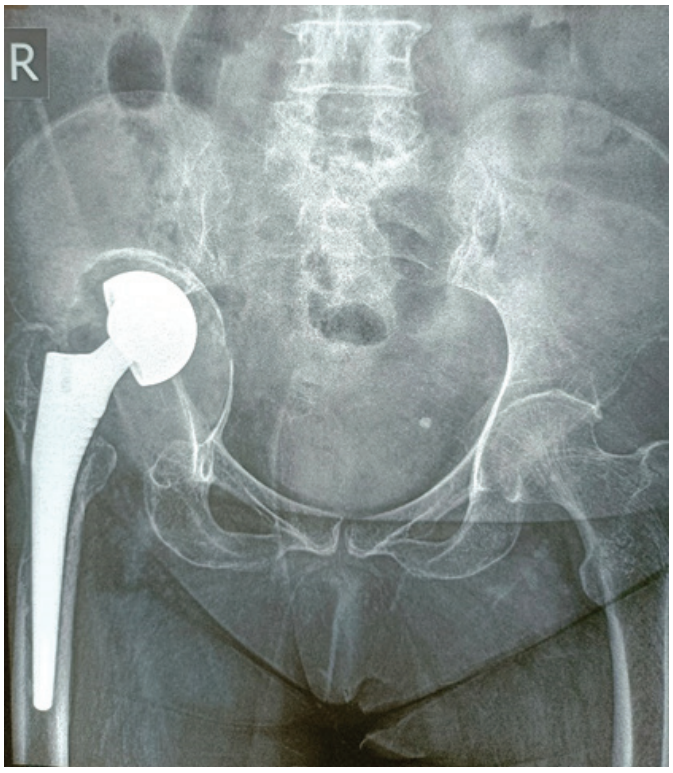


Fig 1: X ray showing acetabular bone destruction causing protrusion acetabuli

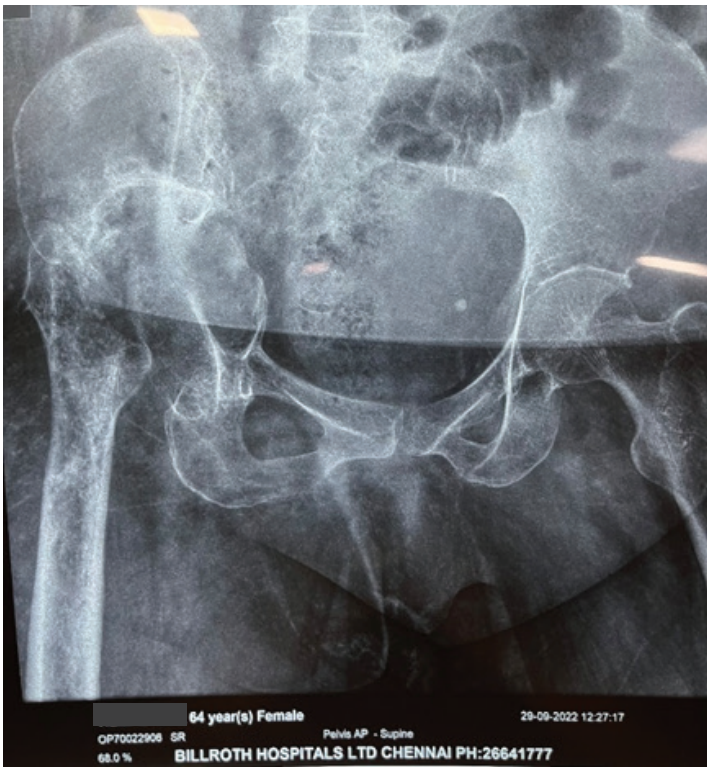


Fig 2: X ray taken after removal of prosthesis from the right hip. There is extensive bony destruction of acetabulam walls right side.

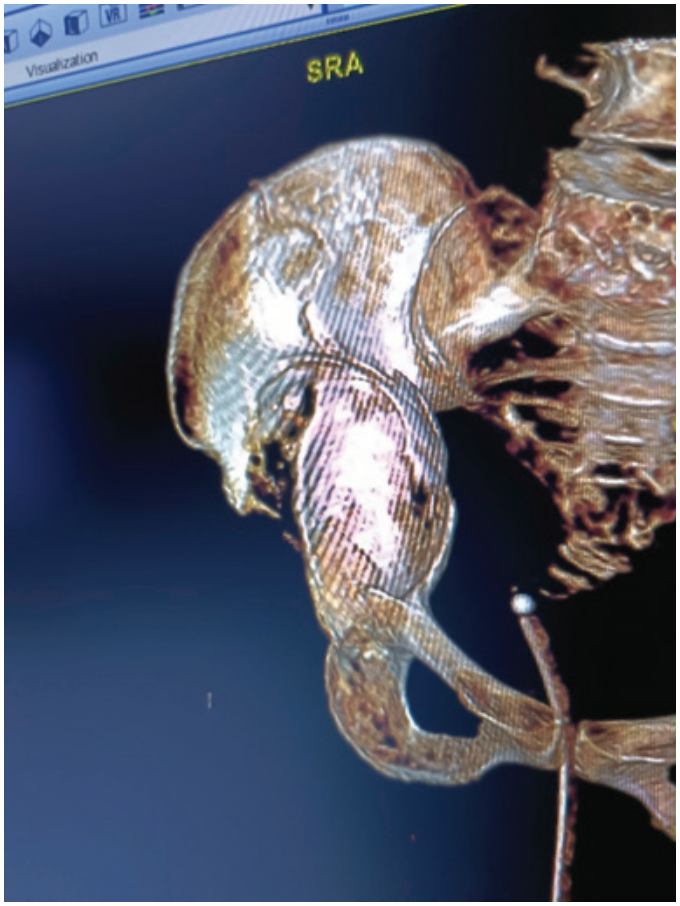


Fig 3: CT 3D images provides virtual images of the extent of bone destruction.

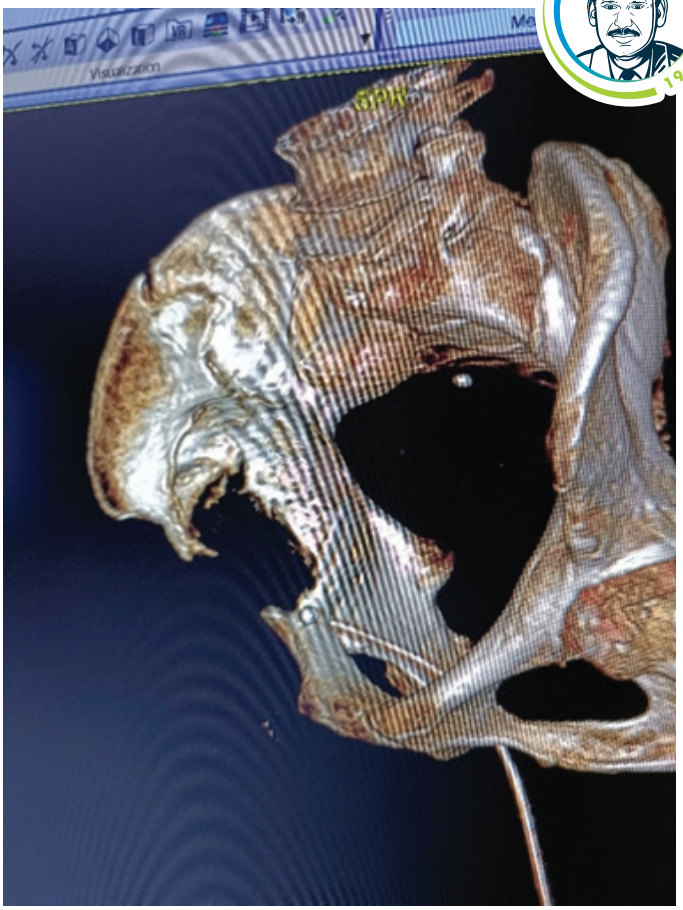


Fig 4: 3D images are vital in pre-operative planning.

68-year-old Lady presented with septicaemia and infection in the right hip (previously done hemiarthroplasty elsewhere) (Fig. 1). She was treated for septicaemia, and the hemiarthroplasty implant was removed (Fig. 2). Through debridement and antibiotic cement beads, implantation was done after optimization of her vitals. Subsequently, she was treated for a periprosthetic joint infection with antibiotics for 6 weeks. Her wound healed well, and the joint infection subsided according to clinical and blood parameters. After a gap of 3 months, she was reassessed for residual infection by hip aspiration culture, which was negative for infection. Therefore, a revision hip replacement was planned.

The preoperative planning was vital as this procedure was not a straightforward one, and there was destruction of the superior and medial walls, resulting in a grossly misshapen acetabulam (Fig. 3). It will be a total disaster to reconstruct the altered anatomy of the acetabulam without any prior planning. The available revision implants cannot be made to fit the deficient acetabulam in an acceptable way. Therefore, a decision to make a custom-made acetabular cup was taken. In order to make a custom implant, the bone model needs to be prepared. After taking CT cuts (1mm) of the acetabulam and femur (Figs. 3 and 4), a plastic (PLLA) model was fabricated using 3D printing technology (Fig 5). This helps to assess the deficiency of acetabulam and femur and make a custom titanium implant (Fig. 7). The implant was designed in such a way to fit the deficient acetabular cavity in the closest possible way.

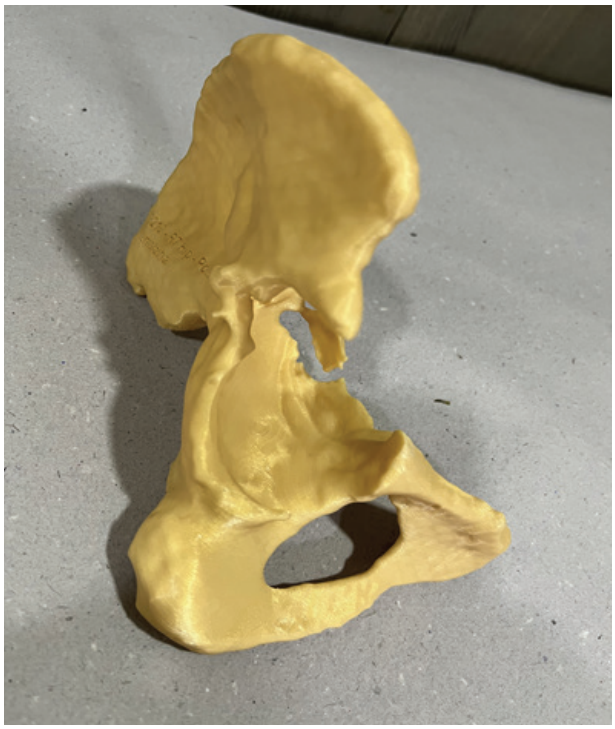


Fig 5: 3D printed bone model showing the extent of acetabular bone destruction.

Fig 7: Definitive Titanium implant which fits exactly in the defect.

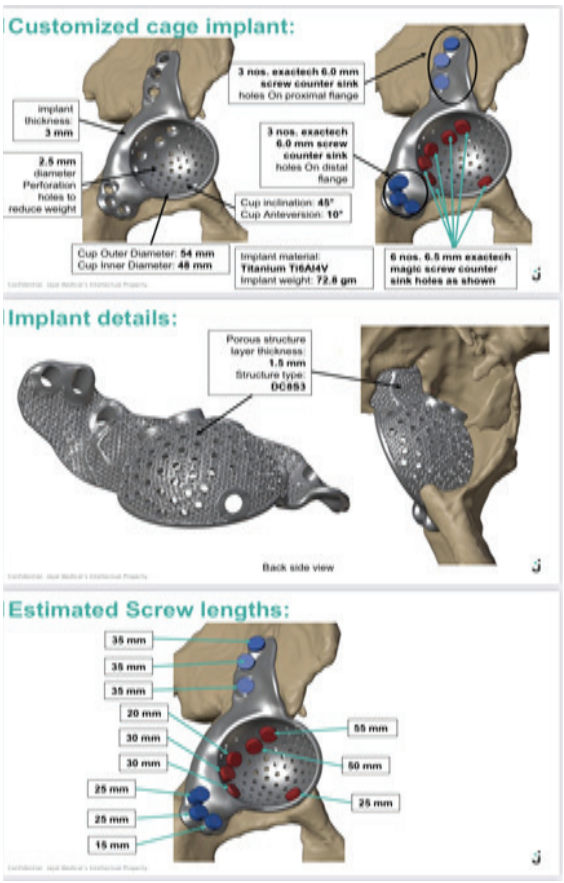


Fig 6: Precise designing of the implant and screw positions and trajectories can be planned with software and 3D printed plastic model is prepared.

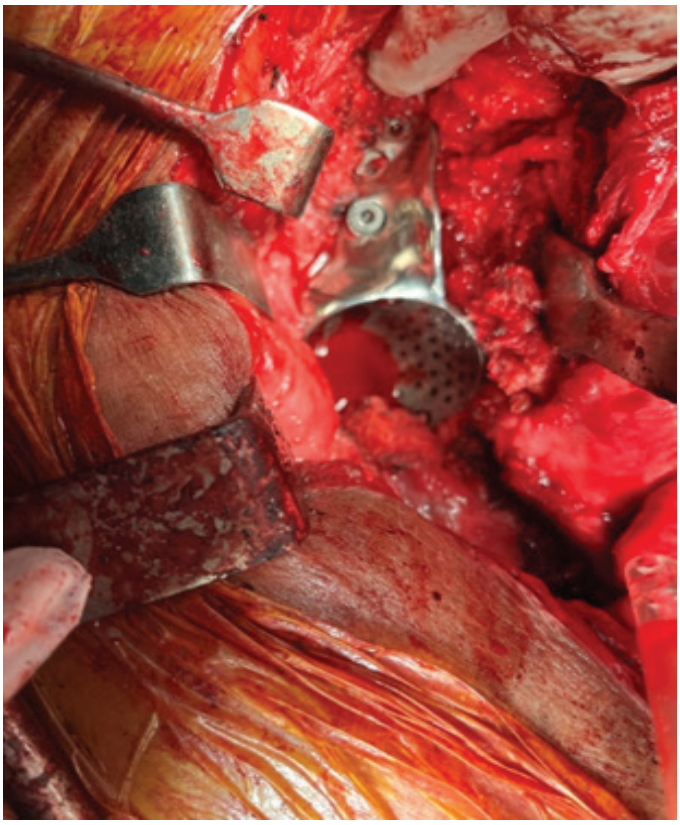


Fig 8: Intra-operative picture showing the custom-made cage implanted inside the acetabulam using multiple screws.

The planning of screw positions and trajectory in the acetabular cage was done with special software (Fig. 6). The back side of the implant was roughened with beads for better bony incorporation. The total duration taken to make a custom implant is 2–3 weeks.

This implant is gas-sterilised and packed in a sealed cover that is opened and implanted at the time of surgery. In this case, the custom-made shell is initially fixed to the defect in acetabulam using multiple screws through preplanned slots made in the shell (Fig. 8). Then the acetabular cup is cemented inside the shell using bone cement.

In order to reduce the complication of dislocation, which accompanies revision surgery, a dual mobility articulation (Fig. 9) was used. Instead of one interface, i.e., between the plastic and head, there will be two interfaces, i.e., the first between the plastic and head and the second between the plastic and metal interface of the cup.

A long, uncemented revision femoral stem was inserted after preparation of the medullary canal (Fig. 10). The stability and range of movements were checked after implantation and found to be stable. The leg length was found to be equal on both sides after the procedure.

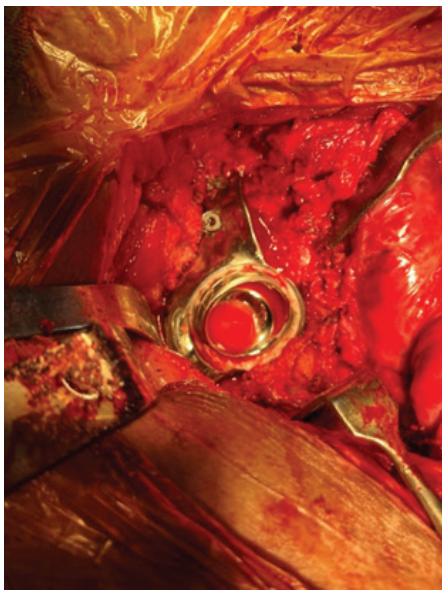


Fig 9: Dual mobility cup was cemented inside the custom-made cage.

Fig 10: Femoral reconstruction with femoral head reduced into the acetabulam.

The patient was mobilized after 2 days following surgery with a walker and discharged home after 4 days. In the postop follow-up after 6 months, the patient was able to walk with crutches. The patient is closely followed for any possible recurrence of infection.

DISCUSSION

Fig 11: Post-operative x-ray of the reconstructed acetabulam with bone grafts behind the cage

Fig 12: Post-operative x-ray

Infection is the common cause of acetabular and femoral loosening. Therefore, prevention of infection in joint replacement is paramount. It is mandatory to follow strict protocol while preparing a patient for joint replacement. Bone destruction is very common in infection, resulting in altered anatomy of the joint. This makes it really difficult for the surgeons performing revision surgeries. Revision surgery is totally a different ball game in the context of implant options and their availability. Multiple revision implant options are available so far, but none of them fulfil the requirements of exact fit and ease of implantability. The custom 3D implant was initially used in maxillofacial surgeries for reconstruction of the face. The same technology is used to make implants for the treatment of severe acetabular defects with or without pelvic discontinuity. 3D printing and implant technology have literally eliminated the difficulties involved in planning and implant design in complex revision hip surgery with massive bone loss. This process significantly reduces the surgery time and enables the surgeon to fix the implant without undergoing a lot of hassles. This technology, NO DOUBT, is a real game changer in difficult revision situations and can give the patient the advantage of a best-fit and stable hip joint in highly complex anatomical situations.

ACKNOWLEDGEMENT:

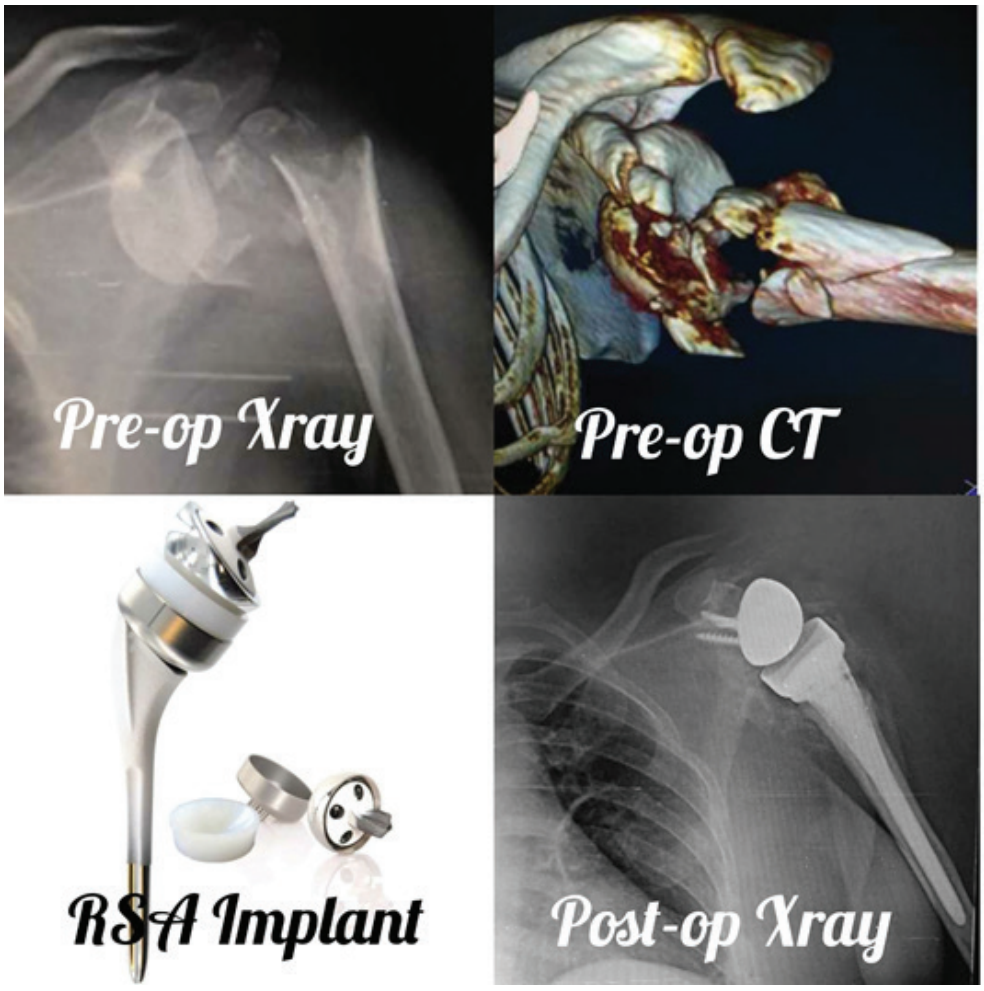
3D printing, planning, designing and manufacturing of custom Implant was done by Jajal Medical, Vadodara, Gujarat.

DR. A. DORAIRAJAN MS D. *ORTH, DNB ORTH, FRCS (GLAS), MSC ORTH (UK)*
SENIOR CONSULTANT ORTHOPAEDIC SURGEON

CASE REPORT: 02

Reverse Shoulder Arthroplasty: A Rewarding Surgery for Unsalvageable Shoulder Trauma!

Reverse shoulder replacement is a type of shoulder replacement in which the normal ball and socket relationship of the gleno-humeral (shoulder) joint is reversed. This creates a more stable joint with a fixed fulcrum. We would like to present a case of successful management of a grossly comminuted fracture dislocation of the shoulder with Reverse Shoulder Arthroplasty (RSA) in a polytrauma patient with a four-year clinical and radiological follow-ups.



A 55-year-old housewife presented to our emergency room with a history of falling from height ten days ago. On further evaluation, she was found to have multiple injuries, which are - as follows:

Comminuted fracture left proximal humerus (head, surgical neck, anatomical neck and proximal shaft) with locked anterior dislocation of shoulder, left scapular body and coracoid process fracture chip fracture of left glenoid, chip fractures of left olecranon and medial epicondyle of elbow, comminuted fracture of right femoral head (Pipkin type 2 fracture), fracture of left superior pubic ramus and anterior wall of acetabulum, fracture left inferior pubic ramus with mild hemoperitoneum, fractures of transverse process of lumbar vertebra L1 to L4, dorsal vertebra D4 body fracture and multiple bilateral rib fractures (3rd to 12th) with minimal left sided pneumothorax. The patient was stabilized in the ER and splinted for the left upper limb

The patient was shifted to the ICU in view of polytrauma for hemodynamic stabilization. The cardio-thoracic team's opinion was sought, and bilateral inter-costal drains were inserted. In view of the gross fracture comminution of the left proximal humerus, surgical reconstruction was not feasible. Hence, the patient was planned for Reverse Shoulder Arthroplasty (RSA). Once the patient was stabilized and fit for the surgical procedure, he was taken up to the OT. A standard deltopectoral approach was used for the left shoulder. Fracture sites were exposed, and comminuted fracture fragments were removed. A dislocated and impacted head fragment was retrieved from the anterior glenoid. The biceps tendon and rotator cuff muscles were found to be torn and contused. The deltoid muscle was intact. The axillary nerve was identified and preserved. After glenoid and humeral preparation, trials were placed and checked under an image intensifier. Reverse shoulder arthroplasty (RSA) was done using a (UNIC Evolutis-France) cemented humeral stem, a helical glenoid base plate fixed with screws, the implantation of a convex glenoid base plate, and a concave humeral cup polyethylene insert assembly over the humeral stem.

The joint was found to be stable with a full range of movements. Post-operatively, the patient was kept on an arm pouch sling, and the patient was started on pendulum exercises from post-operative day 1. The gradual shoulder range of movements was started after three weeks once the patient was pain-free and comfortable. Additionally, the patient underwent a second surgical procedure for fixation of the femoral head fracture. The four-year post-op follow-up x-ray is satisfactory without any evidence of loosening. Clinically, the patient has a pain-free full range of shoulder movement without any functional disability. This case report highlights the importance of joint replacement in complex peri-articular trauma situations where open reduction and internal fixation of fractures are not possible due to the extreme degree of comminution. Whenever there is a peri-articular fracture, the ultimate surgical aim is to achieve anatomical reduction of the fracture and restore joint congruity. This helps us achieve a full range of movements and prevents functional disability.

DR. BALAJI SAIBABA *MBBS, MS (ORTHO), DNB, MNAMS*
ORTHOPAEDIC SURGEON

CASE REPORT: 03

Acetabular Fracture with Femoral Arterial Injury Causing Occlusion – Early Diagnosis and Timely Management

Acetabular fractures usually occur following road accidents or falls from height. These fractures can occur in isolation or in a polytraumatic situation. In a polytrauma patient, a meticulous evaluation is vital in order to avoid overlooking associated vascular injuries. The vascular (arterial) injury can occur in pelvic fractures but is rare in acetabular fractures and is very likely to be missed at the time of initial presentation, especially in a polytrauma situation. If the treatment of a vascular injury is delayed, it may lead to irreversible limb loss.

Our case, Mr. X 26/M, presented with polytrauma following a road accident. His injuries were an acetabular fracture (anterior column), a femoral shaft fracture (right) with a femoral artery, and a bladder injury. The initial evaluation was done as per the ATLS protocol, and hemodynamic stabilization was achieved. The limb evaluation revealed a right femur fracture with swelling of the thigh extending from the groin. There were no external wounds in the groin or thigh. A routine vascular evaluation revealed the absence of a distal pulse in the foot. The imaging study (Doppler) confirmed the presence of a vascular injury (femoral artery) in the affected limb. The CT peripheral angiogram was done immediately and revealed femoral artery occlusion (intimal tear) at the level of the anterior column (acetabular) fracture and urinary bladder injury (Fig: 1). Realizing the imminent danger, the patient was prepared for surgical exploration within 12 hours after the injury. A vascular surgeon's opinion was sought regarding the possibility of vascular bypass, and a urologist was kept informed regarding the bladder injury.

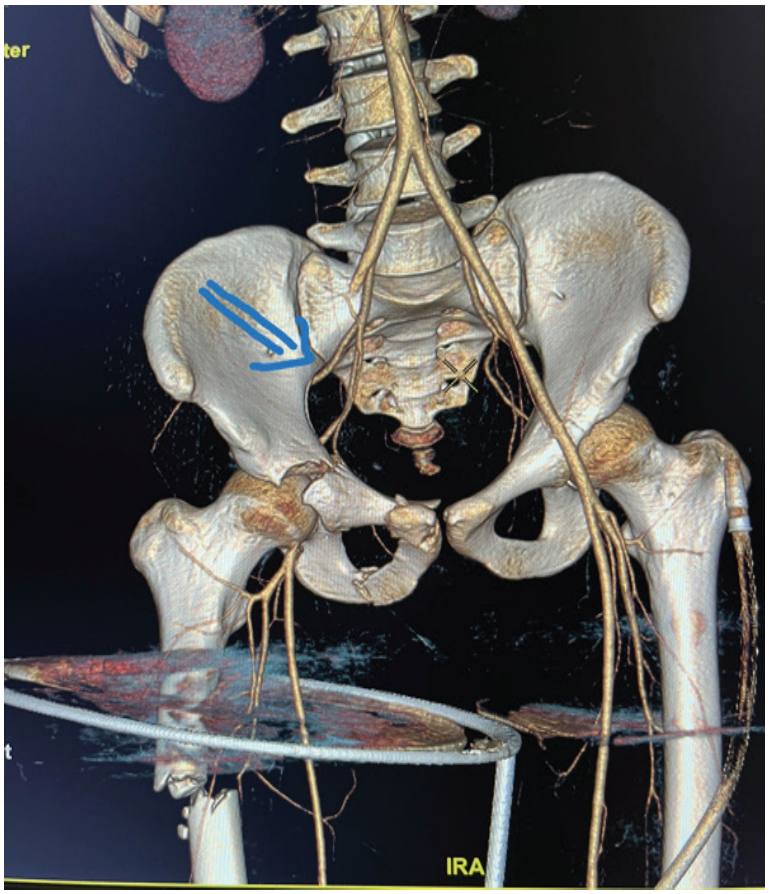


Fig 1: CT showing acetabular fracture (anterior column) right side with external iliac artery complete cutoff (occlusion). Right femur shaft fracture is also evident.

Operative Findings

External fixation of the femoral fracture was done first, as the stabilization of the fracture is vital to the subsequent vascular repair. During exploration, the femoral artery was found to be thrombosed at the level of the inguinal ligament near the fracture. The fracture fragment was moved away from the artery, and the artery was slit open for Fogarty catheter maneuvers. As the intimal tear was severe, it was decided to bypass the thrombosed segment with a PTFE graft (Fig: 2). After successful reconstruction, limb vascularity was restored instantly. Then the anterior column of the acetabular fracture was fixed with a recon buttress plate by a separate medial and lateral window of the ilio-inguinal approach (Fig: 3). After stabilization of the fracture, the vascularity of the limb was checked again to make sure it remained viable. The urinary bladder was repaired by the urologist through the same medial midline approach.

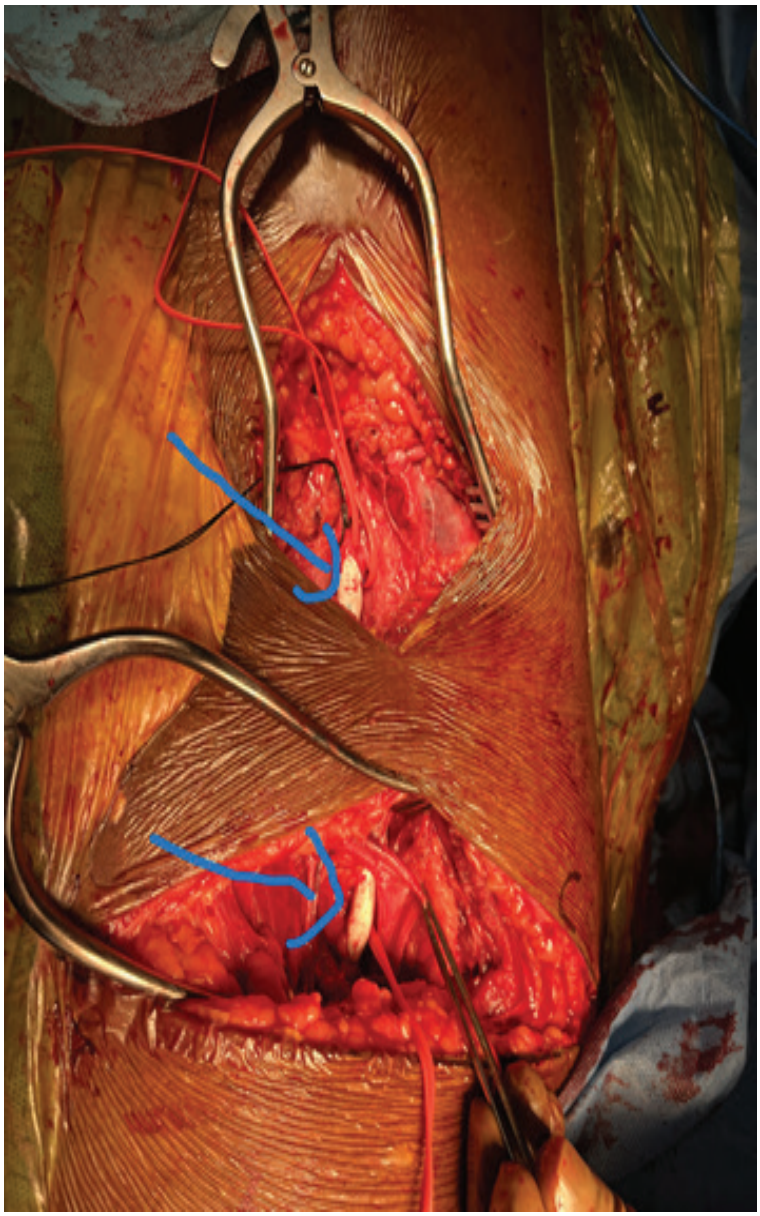


Fig 2: Vascular exploration and PTFE vascular graft bypassing the occluded segment

Fig 3: External fixation of femur and fixation of acetabular anterior column

Post-operatively, the patient was observed in the ICU for any immediate postoperative complications, like bleeding or occlusion of the graft. After 48 hours, there were no complications with regard to vascular reconstruction, like bleeding, occlusion, compartment syndrome, etc. After a gap of one-week, definitive fixation of the femur fracture was done by intramedullary nailing (Figs. 4 and 5). The patient was kept in the hospital for a few days and discharged home. In the 3 months post-surgery, the patient was able to walk independently with near-normal movement of the right hip and had good distal vascular pulses in the affected extremity.

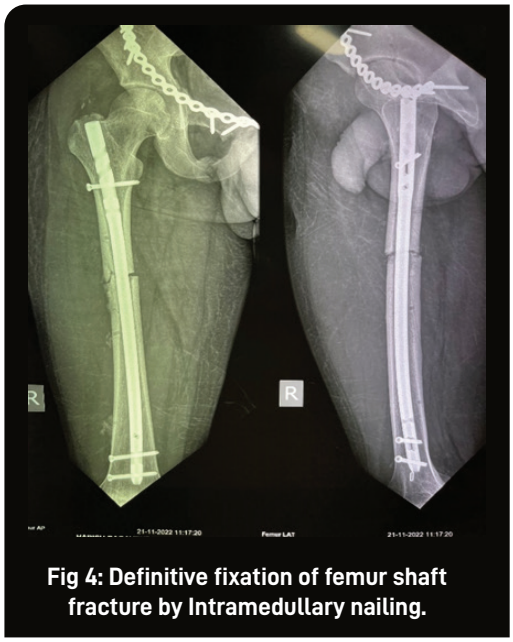


Fig 4: Definitive fixation of femur shaft fracture by Intramedullary nailing.

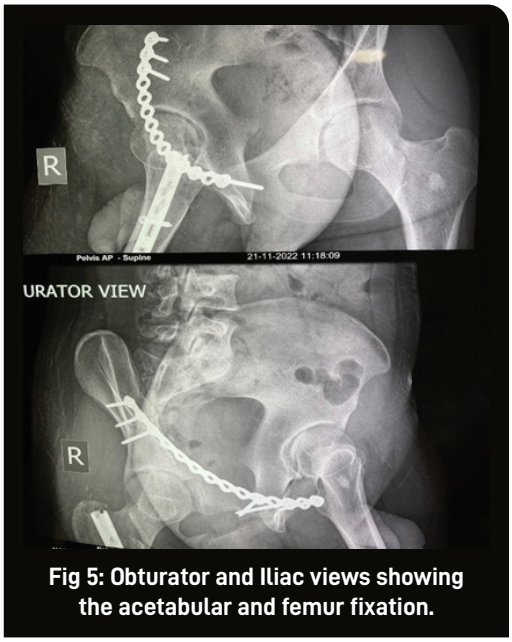


Fig 5: Obturator and Iliac views showing the acetabular and femur fixation.

DISCUSSION

Major vessel injuries occur in approximately 1% of patients with pelvic fractures, and these injuries have mortality rates as high as 75% to 83%, with as many as 60% of these deaths occurring as a result of exsanguination [1], [2]. Most vascular injuries are venous lesions, and even those arterial injuries rarely affect the femoral artery. The superior gluteal, pudendal, and obturator arteries are the most commonly injured arteries. There are two previous case reports in the literature so far of late identification of a femoral artery injury in an acetabular fracture.

1. *Frank J.L., Reimer B.L., Raves J.J. Traumatic iliofemoral arterial injury: an association with highanterior acetabular fractures. J. Vasc. Surg. August 1989;10(2):198–201*
2. *Sivaprasad K, Venugopal K, Jacob Varghese and Yasser abbas anis. Fracture of the acetabulum with femoral artery injury presenting late: A case report. Trauma case Rep 2016 Feb; 2: 28–33*

Unlike the reported cases in the literature, the vascular injury was identified within 6 hours of the fracture. This observation suggests that a high index of suspicion of ilio-femoral artery injury should be entertained by the clinician treating patients with anterior column acetabular fractures sustained by antero-posterior compressive forces. The presence of bruising in the inguinal region may be the only clue to the sinister underlying injury. The 3-D CT scan angiography is a useful tool that may help in confirming the diagnosis pre-operatively if there is suspicion of, or if suggested by, the fracture pattern or clinical signs. Vascular injuries with acetabulum fractures are infrequent but can result in limb loss. Therefore, a high index of suspicion is important in all polytrauma patients, and the diagnosis is aided by 3D CT angiography and immediate intervention involving orthopaedic and vascular surgeons for a successful outcome. Our patient became fully ambulant without any vascular complications.

DR. A. DORAIRAJAN *MS D. ORTH, DNB ORTH, FRCS (GLAS), MSC ORTH (UK)*
SENIOR CONSULTANT ORTHOPAEDIC SURGEON
DR. S. R. SUBRAMANIAM *MS, MCH (VASCULAR SURGERY), FRCS*
SENIOR CONSULTANT VASCULAR SURGEON
DR. SASIKUMAR *MS, MCH (VASCULAR SURGERY)*
CONSULTANT VASCULAR SURGEON

CASE REPORT: 04

Kyphoplasty in Osteoporotic Vertebral Compression Fractures

Osteoporosis and pathological osteoporotic fractures are common findings in the elderly population. The age-standardized annual incidence of vertebral compression fractures (VCF) is 10.7/1000 in women and 5.7/1000 in men, increasing markedly with age. At the age of 75 to 79, the annual incidence was 29.3/1000 in women and 13.6/1000 in men. Due to the continued aging of our population, VCFs represent a major cause of disability and are a burden to the national healthcare system. Non-surgical management with pain control and physical therapy-assisted mobilization has for a long time been the only treatment option in VCF. Unfortunately, a great number of patients remain functionally impaired after VCF, and some of them are severely handicapped due to chronic back pain. The functional and physical consequences of VCF lead to anxiety and depression and have a devastating impact on interpersonal relationships and social roles. It is therefore no surprise that untreated VCF contributes significantly to shorter life expectancy both in women (mortality ratio 1.66, $p < 0.01$) and even greater in men (mortality ratio 2.38, $p < 0.0001$) within one year after the onset of symptoms.

An 83-year-old lady was admitted to the ER following a fall and sustained an injury to the back. She was having severe pain in her back and was unable to get up from the bed on her own. She was able to walk with a little help, though. On clinical and imaging evaluation (X-ray and CT) Figs. 5 and 6, there was a compression fracture of the L1 vertebra without any retropulsion; the most probable cause is osteoporosis. Initially, the patient was advised non-operative management as per treatment protocol. She was mobilized with a brace out of bed. The pain symptoms were so intolerable, so operative treatment was advised.

Operative Findings:

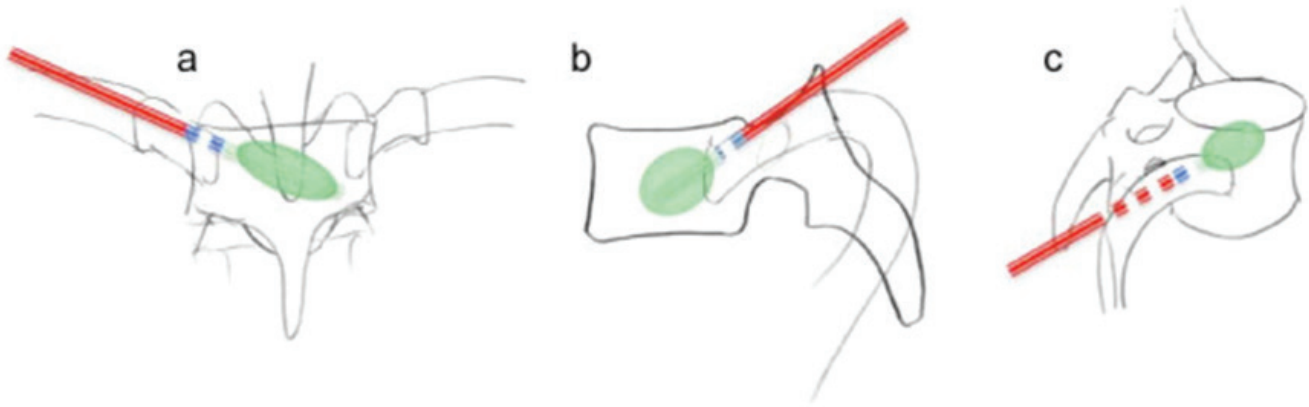


Fig 11: Post operative x-ray of the reconstructed acetabulam with bone grafts behind the cage

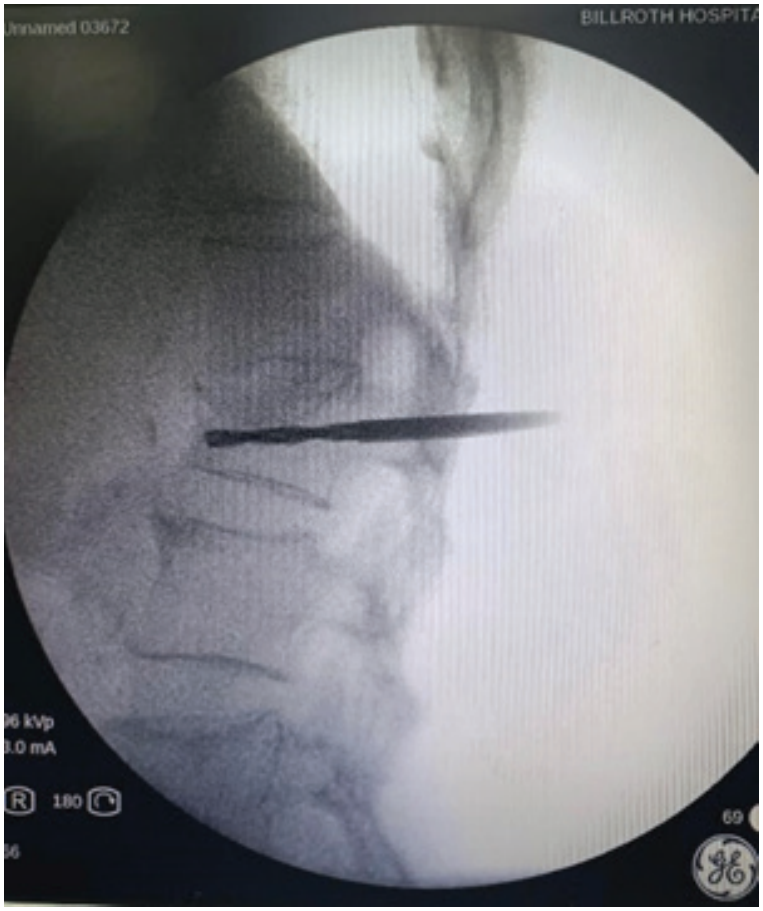


Fig 2: Jamshidi needle is passed into the pedicle of vertebra under Image intensifier control

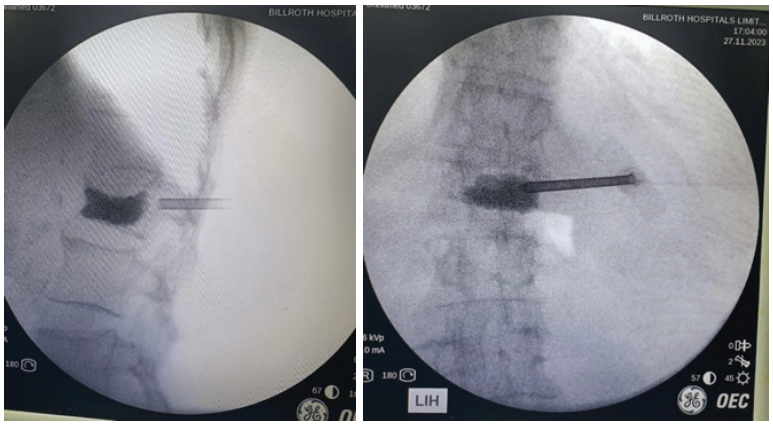


Fig 3: Balloon device inflated and cement passed into the void

The procedure was done in the GA and prone positions with C arm guidance, and the affected vertebra was identified. The Jamshidi vertebroplasty needle is inserted through a stab skin incision (Fig. 1) and through a pedicle into the vertebral body (Fig. 2), and a kyphoplasty balloon is passed through the needle and inflated to achieve correction of kyphosis of the bone. Then the bone cement is delivered into the void created by the balloon, which is completely obliterated (Fig. 3). The stab skin incision is closed with a single stitch (Fig. 4).

The patient was mobilized the next day with the brace. The pain was completely resolved following the procedure.

DISCUSSION

Vertebroplasty is a procedure where cement is injected into the vertebral body of the affected vertebra. The primary goal of vertebroplasty is pain relief through the stabilization of the VCF. The biomechanical understanding of increasing anterior column load with progressing kyphosis leading to subsequent VCF established the basic rationale for kyphoplasty. With this technique, partial reduction of VCF is possible by transpedicular intracorporal balloon expansion and retention by PMMA cement augmentation.

The results of one multicenter randomized controlled trial found shortened and improved functional recovery after kyphoplasty with a low rate of complications if compared to non-surgical treatment (Wardlaw, Lancet, 2009).

CONCLUSION

Kyphoplasty is an effective tool to treat pain caused by thoracolumbar vertebral compression fractures. The complication rate of kyphoplasty is dramatically lower than in alternative open-instrumented procedures, and the immediate pain reduction is significantly greater in kyphoplasty compared to conservative treatment. Therefore, its application remains a pillar of VCF treatment.

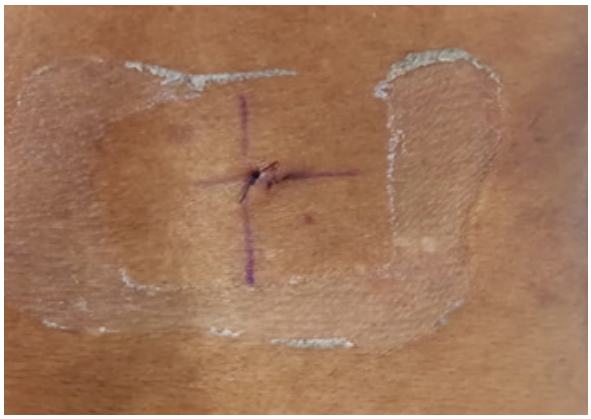


Fig 4: Skin incision

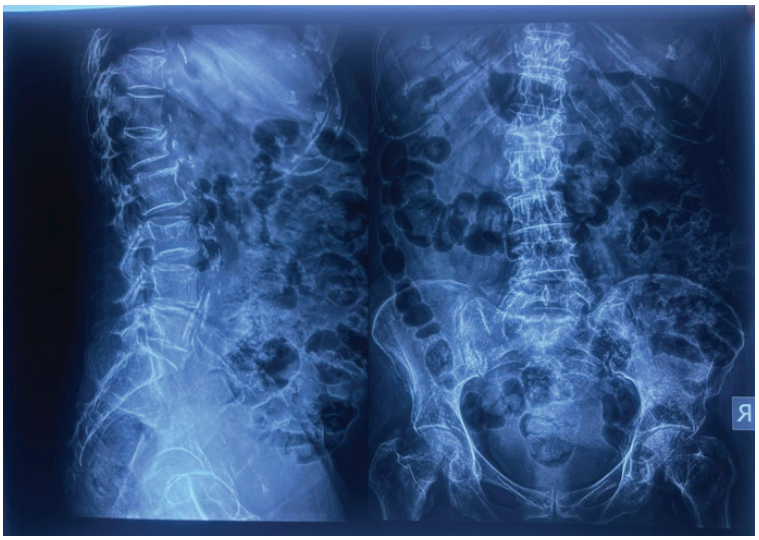


Fig 5: Pre-operative x ray showing compression fracture of L1 vertebrae with kyphosis.

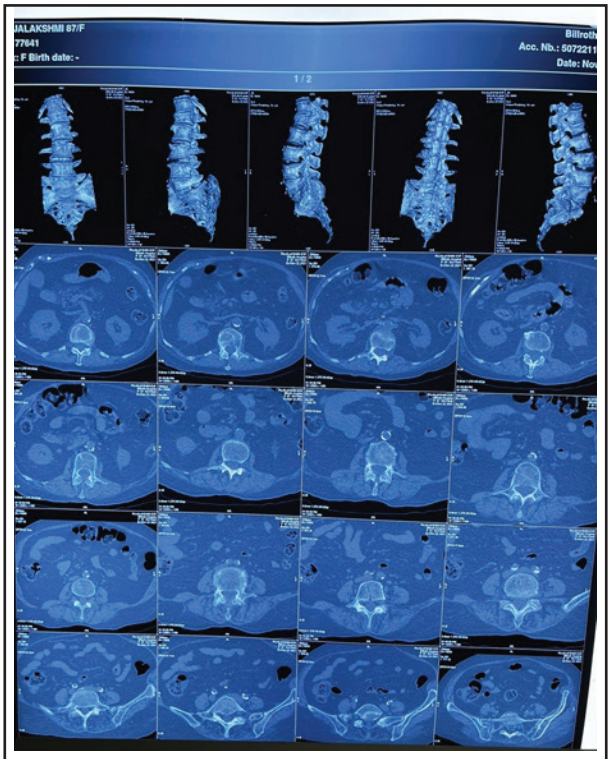


Fig 6: CT showing the VCF without retropulsion and intact posterior cortex

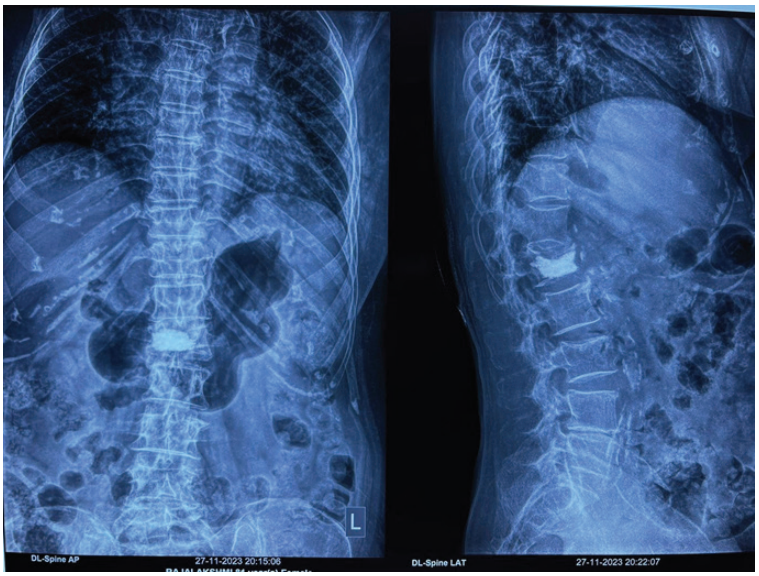


Fig 7: Post-operative X ray showing complete filling of the fracture void with bone cement

DR. BARANI *MS ORTH*
CONSULTANT SPINE SURGEON

DR. A. DORAIRAJAN *MS D. ORTH, DNB ORTH, FRCS (GLAS), MSC ORTH (UK)*
SENIOR CONSULTANT ORTHOPAEDIC SURGEON

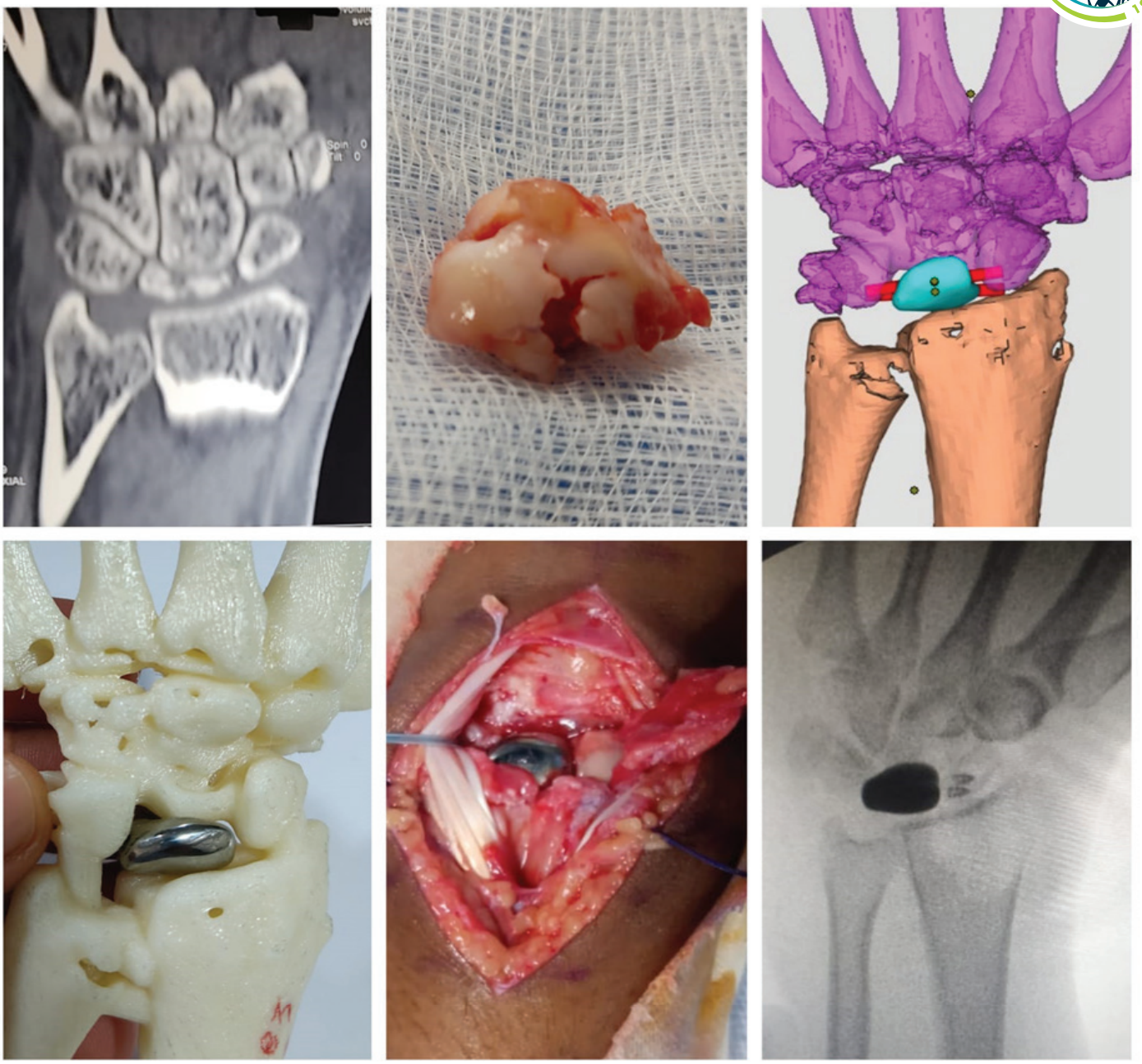
CASE REPORT: 05

Overcoming the Odds to Return to the Normal Life

First In India - A Custom Made 3D Printed Titanium Lunate Replacement for Kienbock's Disease

The lunate is one of the eight small bones (carpals) in the wrist. The lunate is a central bone in the wrist that is important for proper movement and support of the wrist joint. In a rare condition called avascular necrosis (AVN) of the lunate, also known as Kienbock's disease, the lunate bone loses its blood supply, leading to the death (necrosis) of the bone. The condition is most common in young adult men and middle-aged women. There is no single cause of Kienbock's disease. It can be caused by multiple factors, such as skeletal variations (negative ulnar variance), repetitive trauma, and poor blood supply. Damage to the lunate can lead to progressive pain and decreased motion or stiffness of the wrist. Diagnosis can be made with wrist radiographs in advanced cases but may require an MRI for the detection of early disease. In minimally symptomatic patients, management is conservative (non-operative) with non-steroidal anti-inflammatory drugs and immobilization. A variety of operative procedures are available, depending on the severity of the disease and the patient's symptoms. Radial shortening to correct negative ulnar variance is the most common surgical therapy for early stages. Other operative procedures include ulnar lengthening, revascularization, lunate excision with or without prosthetic replacement, and intercarpal fusion. Proximal row carpectomy is used as a salvage procedure in refractory cases with radiocarpal or intercarpal arthritis.

A 23-year-old lady presented with a history of left wrist pain, swelling, and stiffness that progressively increased over a period of three months. There was no history of trauma. On examination, dorsal wrist joint tenderness was present, along with painful restriction of wrist movements. X-rays, MRIs, and CT scans showed sclerosis and collapse of the lunate along with negative ulnar variance. The findings were diagnostic of Kienbock's disease. Usually, in this scenario, partial wrist fusion surgery is advised to address the pain but will invariably lead to limitations in wrist movements post-operatively. Since our patient was young and without any arthritis, we wanted her to have a painless, full functional range of wrist movements. Hence, it was planned for a lunate replacement or arthroplasty. Lunate replacement is an emerging surgical option for patients with Kienbock's disease worldwide. It is not widely done because of the lack of availability of appropriate prostheses or implants. The size and contour of the prosthesis have to perfectly match the patient's wrist joint, not only achieving adequate stability but also restoring joint mobility. To accomplish this goal, we opted for a customized lunate prosthesis using the latest 3D printing technology. In this technique, a CT scan of the patient's opposite [right] side wrist joint is taken and used as a reference to develop a custom-made titanium implant for the affected [left] side using 3D printing to perfectly match the patient's native wrist anatomy. Once the implant was ready, after thorough sterilization, the patient underwent a Lunate replacement surgical procedure successfully. The damaged lunate was excised and replaced with a lunate prosthesis. The prosthesis was secured to the adjacent carpal bones meticulously using mini titanium suture anchors. Post-operatively, the patient is completely pain-free and recovering well with a stable mobile wrist joint.



To our knowledge, this is the first case of lunate replacement in India with a custom-made, anatomically designed, 3D-printed titanium lunate prosthesis for Kienbock's disease. The prosthesis acts as an articulating spacer, restoring both joint stability and mobility, which is a boon for patients with this rare disorder.

DR. BALAJI SAIBABA *MBBS, MS (ORTHO), DNB, MNAMS*
ORTHOPAEDIC SURGEON

CASE REPORT: 06

A Challenging Case of Ruptured AAA

A 78-year-old gentleman, a chronic smoker, presented to the ER with a history of severe, intractable abdominal pain for 24 hours. The patient was admitted to a nursing home, and his CT abdomen revealed abdominal aortic aneurysm with perianeurysmal hematoma collection. The patient was immediately shifted to our hospital for further management. In the ER, the patient was found to be conscious and hemodynamically stable; he had a baseline Hb of 8.9 g/dl and a s. creatinine level of 1.8 mL/dl.

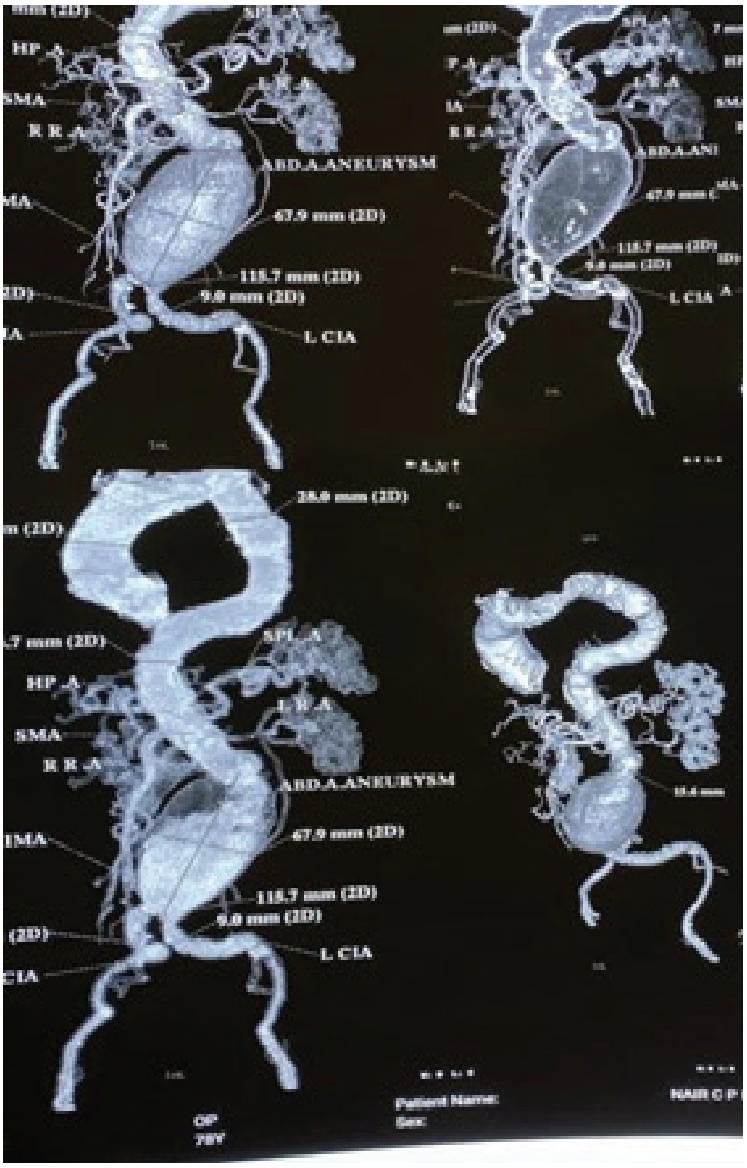


Fig.1: CT Aortogram showing the extent of AAA.

After the initial evaluation, the patient underwent a CT AORTOGRAM to ascertain the size of the aneurysm and to decide the plan of intervention surgical correction or endovascular repair. A CT aortogram revealed a large fusiform aneurysmal dilatation of the infrarenal portion of the abdominal aorta from L1 to L4 level with a transverse diameter of 6.5 cm. There was a huge perianeurysmal hematoma extending from the level of the diaphragm up to the pelvis, extending to the left iliopsoas muscle, with a leak of contrast at the L2 level. The aortic rupture was contained within the retroperitoneal space with reasonable hemodynamic stability.

Risk stratification had a Hardmann Index score of 2 and a mortality rate of 80%. As the aneurysm was close to the renal artery, it was decided to go ahead with surgical correction. The patient was thoroughly evaluated, and his condition was optimized with the help of invasive monitoring and adequate blood products, including PRBC, FFP, platelets, and cryoprecipitate were arranged. After obtaining high-risk consent, the patient was induced with a sleeping dose of an IV induction drug and a muscle relaxant and was intubated and ventilated with IPPV. Midline laparatomy was done, and a large aneurysm with a pulsating hematoma was visualized.

The surgeon skilfully got proximal control of the aneurysm, the most critical step in the surgery. Intravenous nitroglycerin and magnesium were started in preparation for aortic cross-clamping. The patient was maintained on low-normal CVP and started on plasma transfusions. Aortic cross-clamping was applied infrarenally, and the hematoma was explored. About 3.5 liters of blood were suctioned out, and aortic repair was done with an aortic bi-iliac graft. During aortic cross-clamping, the patient had elevated diastolic pressure and ventricular ectopics. It was managed by increasing the anesthetic depth, vasodilator boluses, and infusions. Magnesium was infused for control of the ventricular ectopics. Cross-clamp time was kept at a minimum of 40 minutes. After the placement of the aorta biiliac graft, the patient was prepared to deal with the aftereffects of aortic unclamping, which are primarily a drastic reduction of afterload, hypotension, blood loss, and lactemia secondary to cross-clamping. Pt was rushed with blood products, and CVP was kept at elevated levels and was started on a phenylephrine infusion. Aortic unclamping was done, and sodabicarbonate was administered to correct the metabolic acidosis. All throughout the process of aortic clamping and unclamping, care was exercised to maintain BP within the normal autoregulation zone to avoid organ damage. The patient was administered diuretics and N-acetyl cysteine for renoprotection. Serial ABGs were done, and normothermia was maintained with warmed IV fluids and forced air warming. Care was given to maintain a core body temperature above 35 °C, as hypothermia could lead to myocardial irritability and coagulation abnormalities. The patient was electively ventilated in the post-partum period.

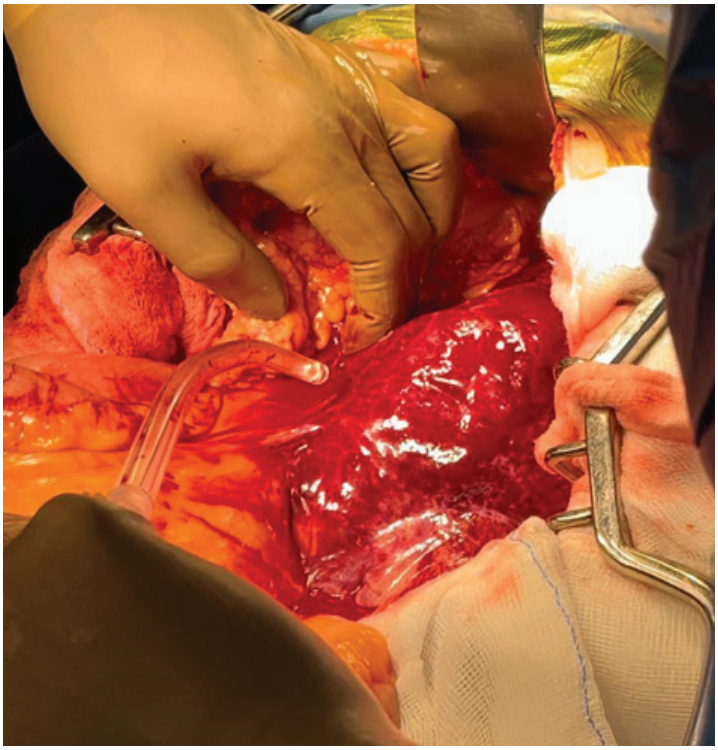


Fig.2: Large pulsatile hematoma encircling the Aortic Aneurysm.

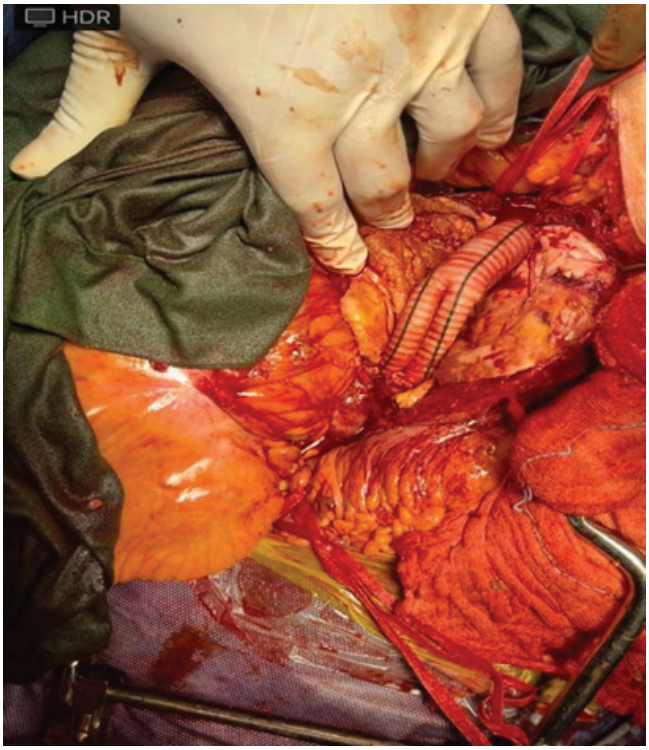
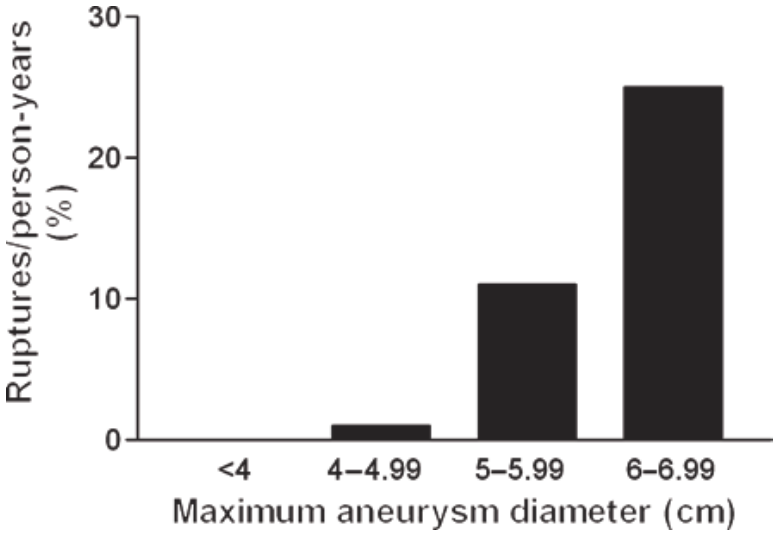


Fig.3: Placement of Aortic Biiliac graft after repair of AAA.

The patient had accelerated hypertension and was managed intensively in the postpartum period. On the first POD, the patient was weaned off the ventilator and extubated. The patient had elevated creatinine levels, and Nephrologists advice was followed. Early postop mobilization and intense chest physiotherapy were done and started on DVT prophylaxis. The patient had a prolonged ileus and required close to ten days to regain his baseline renal function. Pt was successfully discharged on the tenth postop day and is on regular follow-up.

DISCUSSION

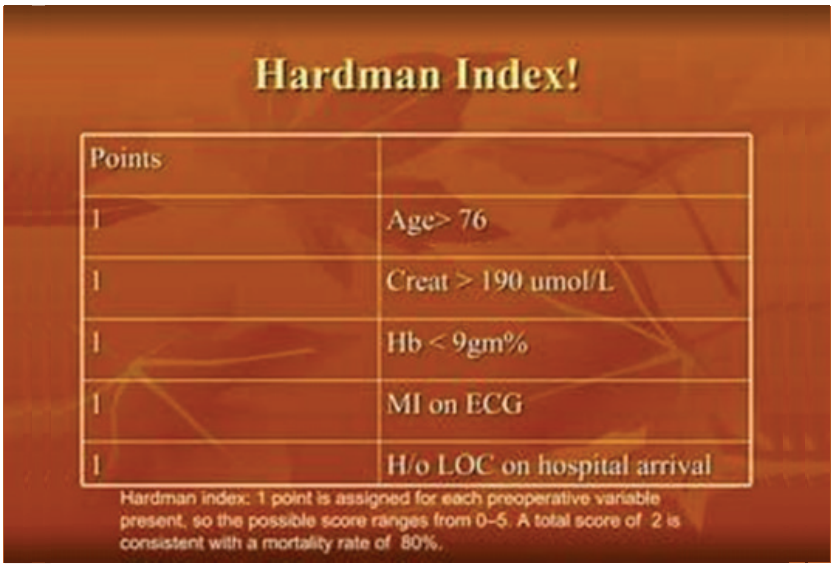
Ruptured abdominal aortic aneurysm (AAA) is commonly fatal, with an overall mortality rate of 65%. The mortality rate for patients who survive to reach the hospital and undergo emergency surgery is ~36%, compared with 6% for elective repair. The Multicentre Aneurysm Screening Study demonstrated a 53% reduction in mortality in UK men aged 65–74 who attended for regular screening ultrasound and underwent elective surgery when the aneurysm diameter reached 5.5 cm.



Graph 1: Risk of abdominal aortic aneurysm (AAA) rupture per year based on aneurysm size at last ultrasound.

RISK STRATIFICATION

The Hardman index for ruptured AAA was published in 1996 and contains five preoperative variables with a range of possible scores of 0–5. Recent studies have predicted a mortality rate of 80% with a Hardman index ≥ 2. Overall, it should be recognized that scoring systems have their limitations and should only be used to supplement clinical judgment.



ANAESTHETIC MANAGEMENT

Monitoring, Blood Transfusion, and Thermoregulation

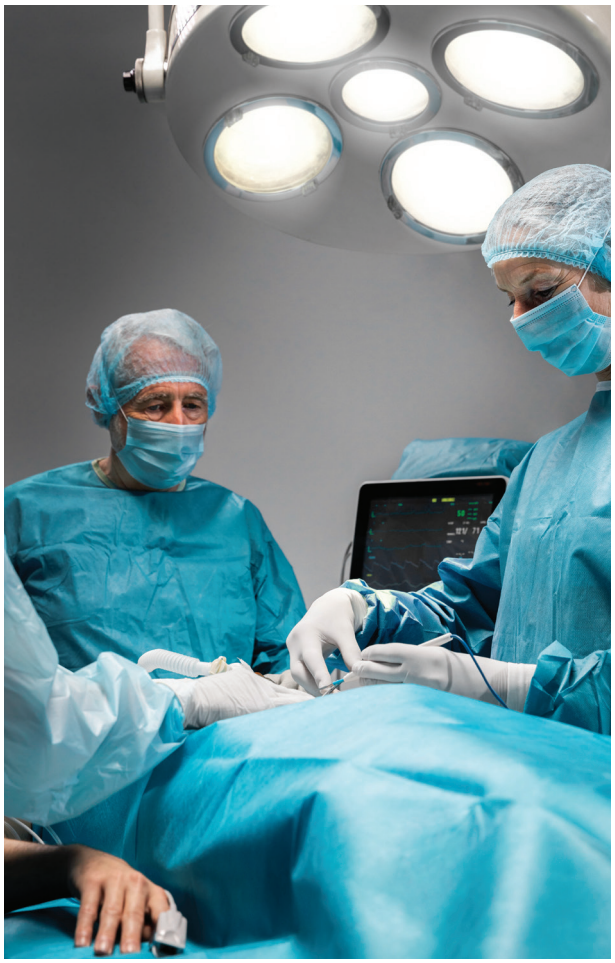
Ruptured abdominal aortic aneurysm (AAA) is commonly fatal, with an overall mortality rate of 65%. The mortality rate for patients who survive to reach the hospital and undergo emergency surgery is ~36%, compared with 6% for elective repair. The Multicentre Aneurysm Screening Study demonstrated a 53% reduction in mortality in UK men aged 65–74 who attended for regular screening ultrasound and underwent elective surgery when the aneurysm diameter reached 5.5 cm.

Induction

Induction of anesthesia in patients with a ruptured AAA may be associated with cardiovascular collapse because of: (i) the cardiodepressant effects of intravenous and inhalational agents; (ii) relaxation of the abdominal muscles reducing the tamponade effect; (iii) intermittent positive pressure ventilation, reducing venous return; and (iv) a reduction in sympathetic tone. The main objectives are to maintain anesthesia with cardiovascular stability and normothermia as far as possible. A modified rapid sequence induction using a carefully titrated dose of the induction agent followed by succinylcholine is appropriate. In an effort to reduce the required dose of an induction agent, opioids (e.g., fentanyl, alfentanil) may be administered.

Aortic Cross-Clamping

The physiological response to aortic cross-clamping depends on a number of variables, including preoperative left ventricular function, collateral circulation, and the level of the cross-clamp. Once the aorta is cross-clamped, the increased afterload may cause hypertension proximal to the clamp. Vasodilators can help lower the left ventricular end diastolic volume by decreasing ventricular wall tension, decreasing the force of contraction, and improving endocardial perfusion. These effects will tend to improve the balance of myocardial oxygen supply and demand. This can also be achieved by increasing the depth of anesthesia. Vasodilators also allow intravascular fluid loading in preparation for clamp release. Vasodilators, though, can exacerbate organ ischaemia by reducing perfusion pressure in the collateral circulation, so due care must be exercised. Patients with severe aorto-occlusive disease, on the other hand, have a well-developed collateral circulation and, surprisingly, show minimal response to cross-clamping.



Aortic Unclamping

Unclamping may result in a dramatic reduction in blood pressure. The causes for this are a decrease in systemic resistance due to the removal of the cross clamp, the release of vasoactive cytokines and metabolites from ischaemic tissues, central hypovolemia due to the sequestration of blood in the reperfused organs, and the release of myocardial depressant factors.

The severity of hypotension is proportional to cross-clamp time. Hemoglobin should be maintained at 9–10 g/dl, as IHD is common in these patients. Blood products (FFP, platelets, and cryoprecipitate) are usually given according to clinical need when hemostasis is secured and an aortic cross-clamp is removed. Thromboelastography testing can be used to monitor and help manage coagulopathy. Ensuring adequate fluid resuscitation and gradual release of the cross clamp minimizes declamping hypotension. Vasopressors may be used but have the potential disadvantage of preferential vasoconstriction of the vasculature above the clamp. Reclamping may be required in cases of resistant hypotension.

Maintenance of Renal Function

The main cause of renal complications after AAA repair is the decrease in renal blood flow and decreased renal perfusion pressure (outside autoregulation), augmented by the increasing renal vascular resistance (by 30%) associated with aortic clamping. Myoglobin release from ischaemic tissues may contribute to acute tubular necrosis by decreasing local nitric oxide release. Postoperative dialysis rates are similar in patients who have undergone either suprarenal or infra-renal aortic cross-clamping. Several drugs (dopamine, N-acetyl cysteine, mannitol, and furosemide) have been used in an attempt to protect against AKI, although none have been shown consistently to be beneficial, and diuretics should be used only after adequate fluid replacement and volume loading. Loop diuretics could potentially decrease renal tubular reabsorption and oxygen demand. Infra-renal cross-clamping reduces renal blood flow by up to 40% through the alteration of the renin-angiotensin system. The mainstay of renal preservation is adequate fluid resuscitation and the avoidance of nephrotoxins (NSAIDs, ACEIs, aminoglycosides).

Postoperative Care

All patients should be transferred to the ICU postoperatively, where supportive care includes optimization and maintenance of circulating volume. Re-warming will continue until a normal body temperature is achieved, and respiratory support is usually required for up to at least 24 hours and frequently several days. Renal function, coagulation, hemoglobin, and acid-base balance are monitored closely. Renal replacement therapy is required in a significant proportion of patients, and those with a coagulopathy may require a continuing blood product transfusion. Other important issues include an anticipated prolonged ileus and analgesia. Patients are particularly prone to developing intra-abdominal hypertension (intra-abdominal pressure ≤ 12 mmHg) and abdominal compartment syndrome (ACS, defined as IAP ≤ 20 mmHg).

Endovascular Abdominal Aortic Aneurysm Repair

Endovascular aneurysm repair (EVAR) is increasing in popularity amongst both vascular surgeons and interventional radiologists as it avoids the need for a laparotomy in a group of patients who usually have significant co-morbidity. EVAR may be performed under local anesthesia with or without sedation, regional anesthesia, or general anesthesia. Conversion to general anesthesia may be required in up to 25% of cases. Some retrospective studies suggest a good outcome with local anesthesia, but there is no prospective data to show that any one anesthesia technique is superior.

Conclusion

Open repair of AAA is a major, high-risk surgical procedure. Frequently, these patients have significant co-morbidities and poor physiological reserves. In order to achieve good outcomes, risk factors should be optimized, the surgical intervention planned, pathophysiology understood, and organ protection strategies used. Effective communication and teamwork are essential.

DR. T J JEYKUMAR *MD (ANAESTHESIA), FICM*
CONSULTANT ANAESTHESILOGIST-INTENSIVIST

CASE REPORT: 07

Relationship Between Subcalcaneal Fat Pad Thickness and Plantar Heel Pain: A Case Control Study

Abstract

Heel pain is common in active young and old adults. Plantar pain usually develops due to degeneration of heel fat pad. Loss of elasticity and changes in thickness of fat pad are considered to cause plantar heel pain.

Introduction

This study aimed to test the hypothesis that loss of heel pad shock absorbency contributes to plantar heel pain. The range of thickness and elasticity of the heel pads in patients with plantar heel pain in different age, weight, and gender groups were determined and compared with those of a healthy population.

Material and Methods

This study was a case control study. Subjects aged 25 – 60 years of both the genders were included in the study. The study population were grouped as 2 groups; cases and controls. Lateral radiograph of the feet was taken loaded and unloaded by body weight, with a tube film distance of 40 inches. Heel pad compressibility index, heel pad thickness in loading (HPTL), heel pad thickness in unloading (HPT- UL) were considered as primary outcome variables and demographic variables, anthropometric variables, personal history are considered as Study relevant parameters. Heel Pain was considered as Primary explanatory variable. P value < 0.05 was considered statistically significant. Data was analyzed by using coGuide software, V.1.01.

Results

As total of 180 subjects with heel pain were analysed, with 120 (66.67%) grouped as cases and 60(33.33%) as controls. There was statistical insignificant difference in the age, body weight height, BMI habits such as smoking and alcohol between the groups (p>0.05). The median values of Heel pad compressibility index, Heel pad thickness in loading (HPTL), Heel pad thickness in unloading (HPT UL) between the cases and controls were statistically insignificant. The back foot pain was significant in cases (p<0.01).

Conclusions: Although this study found back heel pain contributing to greater proportion in cases, neither Heel pad compressibility index, Heel pad thickness in loading (HPTL), Heel pad thickness in unloading (HPT UL) between the cases and controls could prove our study hypothesis.

Heel-pad compressibility index (HPCI): The ratio of thickness in loaded and unloaded position was the definition for HPCI. Average thickness of both the feet was considered for HPCI calculation in both cases and controls. An HPCI index approaching 1 indicated a lack of elasticity of heel pad (Figure-2).

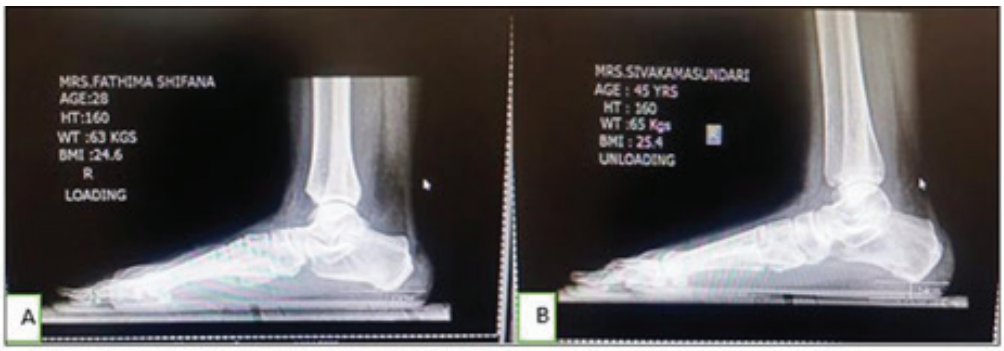


Fig 1: Lateral radiograph of the foot in loaded (A) and unloaded (B) by body weight

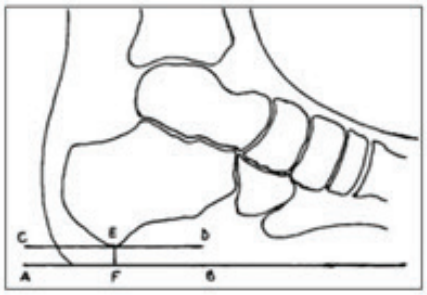


Fig 2: Heel pad measured at shortest distance between calcaneus and plantar surface of the skin (EF). AB = the skin line; CD = the longest part of the plantar tuberosity of the calcaneus

Heel-pad compressibility index (HPCI): The ratio of thickness in loaded and unloaded position was the definition for HPCI. Average thickness of both the feet was considered for HPCI calculation in both cases and controls. An HPCI index approaching 1 indicated a lack of elasticity of heel pad (Figure-2).

Compressibility index: DICOM images were used as source (which had PPI information) for the calculation of length in the image field below the plantar tuberosity of calcaneum to the skin edge. Ratio of the measurements obtained was the compressibility index (Figure-2).]

DR. TV RAJA *D.ORTHO, M.CH ORTHO, DIP IN FOOT SURGERY (FRANCE)*
DR. ASHWIN ANNAMALAI *MS ORTHO*
CONSULTANTS ORTHOPAEDIC SURGEONS

NUTRITION CORNER

Essential Nutrients for Optimal Bone Health

It is important to maintain bone health with adequate nutrition. Proper food habits can prevent the bones from deteriorating with age. Maintaining bone health with adequate nutrition is not as difficult as you might think. Just make sure you take in foods rich in the below-mentioned nutrients as they help maintain bone health.

Calcium

Calcium is the key nutrient when it comes to maintenance of bone health. As old bone cells are constantly broken down and replaced by new ones, it's important to consume calcium daily to protect bone structure and strength. A diet low in calcium contributes to diminished bone density, early bone loss and an increased risk of fractures. Good sources of calcium include dairy products, leafy green vegetables, certain types of fish, oatmeal and other grains, tofu, cabbage, summer squash, green beans, garlic, sea vegetables and calcium- fortified foods such as cereals and orange juice.

Vitamin C

Vitamin C is essential for promoting production of bone forming cells and connective tissues. As it is also a powerful antioxidant, it protects bone cells from damage and also helps with collagen synthesis for bone mineralization. Food sources of Vitamin C include citrus fruits, berries, pineapple, guava, amla, broccoli, bell peppers, etc.

Vitamin D

Vitamin D plays several roles in maintaining bone health, including helping the body absorb calcium. Vitamin D deficiency is a major cause for bone-related disorders. The major source is sunlight. Food sources include fatty fish, organ meats, eggs, and mushrooms. The dietary sources of vitamin D are very limited and most of the time, they are not sufficient to meet the body's demands. Hence, assess your blood levels and meet a nutritionist in case you require supplementation.

Vitamin K

Vitamin K supports bone health by modifying osteocalcin, a protein involved in bone formation. This modification enables osteocalcin to bind with minerals in bones and helps prevent the loss of calcium from bones. Vitamin K is abundantly found in green leafy vegetables, cruciferous vegetables, peas and eggs.

Magnesium

Magnesium plays a key role in converting vitamin D into the active form that promotes calcium absorption. It also enhances bone mineral density and reduces the risk of bone fractures and osteoporosis. Nuts, seeds, legumes, green leafy vegetables, dark chocolate are good sources of magnesium.

Zinc

Zinc is a trace mineral, and is required in very small amounts. It helps make up the mineral portion of your bones. In addition, zinc promotes the formation of bone building cells and prevents the excessive breakdown of bone. Seafood, roasted Bengal gram, wheat germ oil, spinach, pumpkin seeds, and nuts are an excellent source of zinc.

Omega 3 Fats

The anti-inflammatory properties of omega 3 have preventive effects on arthritis. Fatty fish, flax seeds, chia seeds, pumpkin seeds and nuts contain good amounts of essential fats.

Proteins

Researchers have reported that low-protein intake decreases calcium absorption and may also affect rates of bone formation and breakdown. Good quality proteins include fish, chicken, eggs, milk and milk products. Nuts and oilseeds, roasted Bengal gram, pulses and lentils also contain proteins. A balanced diet along with adequate amounts of the above-mentioned nutrients are essential to ensure good bone health. In addition to these essential nutrients, regular exercises such as walking or strength training helps to stimulate bone growth and help maintain bone density. Also limit alcohol consumption and smoking as they can negatively impact bone health.

DIVYA PURUSHOTHAM, *M.SC. CLINICAL NUTRITION (SRMC)*
CHIEF NUTRITIONIST, SPECIALISATION IN RENAL & SPORTS CERTIFIED DIABETES EDUCATOR, IDF

Physiotherapy for Better Life

One of the most crucial treatments a person may obtain for their health is physiotherapy. Enhancing one's physical, mental, and social well-being can be beneficial. There is an increasing need for physiotherapy in delta services in today's society. Physiotherapy is the way to help restore movement and function in the body when someone has been injured or suffers from an illness or a disability. It plays a vital role in numerous specialties like orthopaedics, neurology and neurosurgery, cardiopulmonary, plastic surgery, vascular surgery, pediatrics, geriatrics, sports rehabilitation, general surgeries, obstetics, and gynecology.

- This includes conditions such as musculoskeletal problems, postural disorders, sports injuries, and so on.
- Neurology and neurosurgery problems such as Cerebral Vascular Accident [CVA], brain injuries, spinal injuries, cervical and spinal abnormalities, and parkinsonism.
- Cardiovascular diseases like coronary artery disease [CAD], Chronic Obstructive Pulmonary Disease [COPD], and all other pulmonary disorders.
- Physiotherapy is crucial in the pre- and post-operative care of organ transplantation, such as the liver and kidney.
- Pediatric conditions such as cerebral palsy [CP] and Down Syndrome.
- Geriatric general surgery: post-operative care of hernia repair and small intestinal obstruction.
- Treating gynecological pre- and post-natal cases, as well as urinary incontinence.
- Pelvic floor conditioning program for PCOS/PCOD polycystic ovarian syndrome.
- Kinesiology tapping, manual muscle release, cryotherapy, Neural Development Therapy [NDT], Manual Joint Mobilization, Mirror Therapy, and Parallel Bar Gait training are some of the treatments used in our discipline.
- Modalities such as Interferential Therapy [IFT], Ultrasound Therapy [UST], Short Wave Diathermy [SWD], Laser Therapy, War Therapy, Intermittent Cervical & Lumbar Traction, Continuous Passive Movement [CPM] for the ORIF procedure, Cryotherapy, and Electrical Nerve Stimulations to relieve pain.

Physiotherapy services are frequently used to help people with various diseases, deformities, and other physical impairments return to normal living.

C. R. DURGA SENTHIL
HEAD OF DEPARTMENT - PHYSIOTHERAPY & TEAM

To Hell and Back!

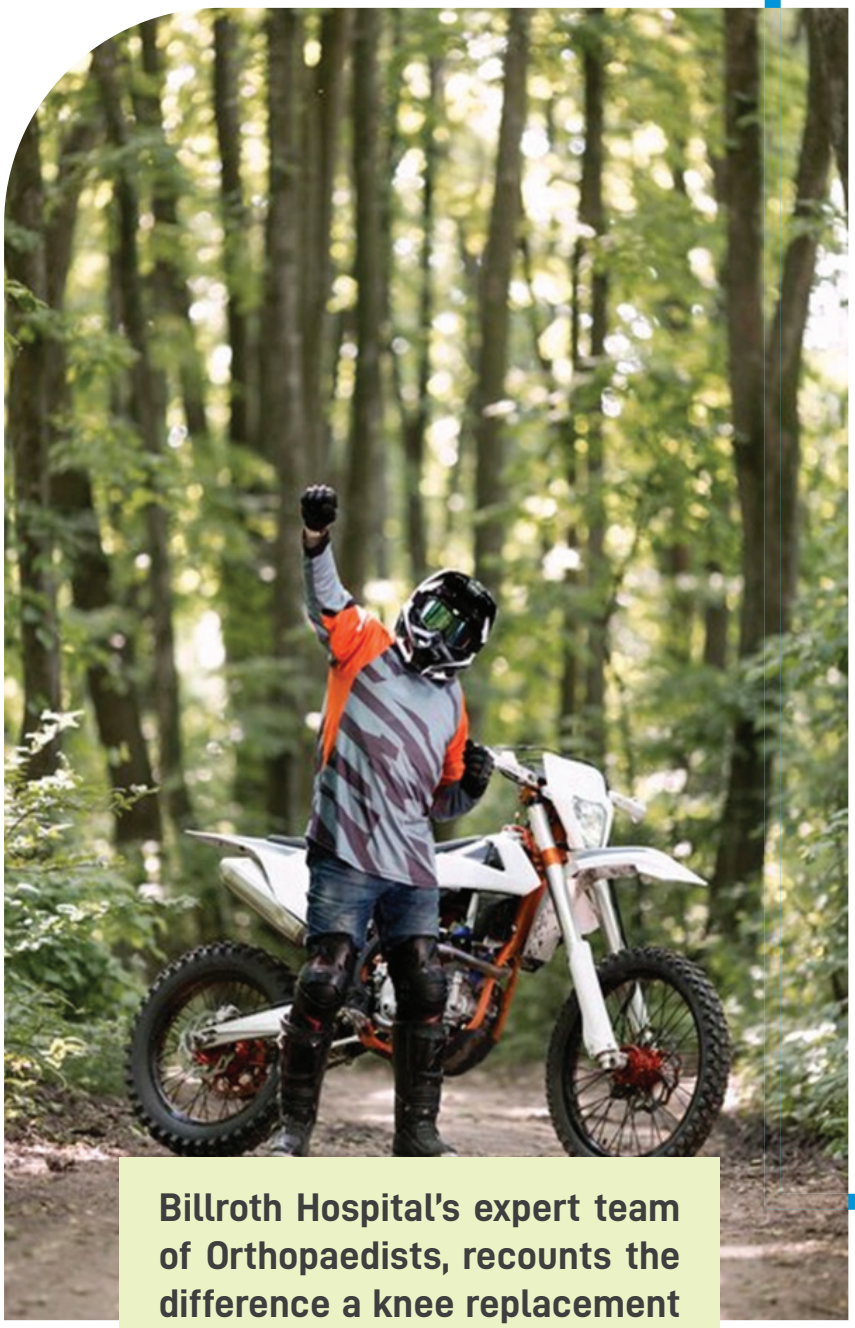
From Superman to Spinal Cord Victim

The most famous spokesperson for spinal cord injuries, Christopher Reeve, passed away in October 2005. Tall, handsome and athletic Christopher Reeve shot to fame for his role as Superman. He was the epitome of masculine fitness.

A sportstar and athlete, one of the many sports Reeve enjoyed was showjumping. On May 27, 1995, Christopher Reeve fell off his horse accidentally and suffered a cervical spinal injury that paralysed him from neck down. His first and second vertebrae were shattered. His head and spine were later reconnected, the first of many surgeries and procedures.

A gruelling 10 years followed – but Reeve realized that he could use his name to benefit everyone with spinal cord injuries. He set up the Christopher Reeve Foundation, which supports research into spinal cord injuries. He was a spinal cord victim who was a Superman till the very end.

"From Bike to Bed... and Back"



PAINFUL ARTHRITIC KNEES KEPT MR. BIJU AWAY FROM THE SMALL JOYS OF HIS LIFE. COULD WE RESTORE IT?

Billroth Hospital's expert team of Orthopaedists, recounts the difference a knee replacement can make.

CONTINUING THE MOMENTUM:

A Lifeline Support to Prevent Monsoon Disease

In presence of **Mr. Ma Subramanian,** Minister for Medical and Family Welfare, Billroth Hospitals extended a helping hand to individuals who face barriers to accessing affordable medical care during the challenging season. Billroth's medical camps, held at various locations across the city, aimed to bridge the healthcare gap and ensure that everyone, regardless of economic status, receives the attention and care they deserve. Our dedicated team including doctors, nurses, and support staff, worked tirelessly to offer medical examinations, treatments, and valuable guidance on preventive measures.

A Shelter from the Storm:

Billroth Hospital's Medical Camp

As the monsoons set in, bringing with them an array of seasonal challenges, Billroth Hospital embarked on a mission to ensure that no one in our community is left behind when it comes to healthcare. Our recent medical camps were strategically organized to address the specific health risks associated with the rainy season and provide preventive care to those who are most vulnerable.

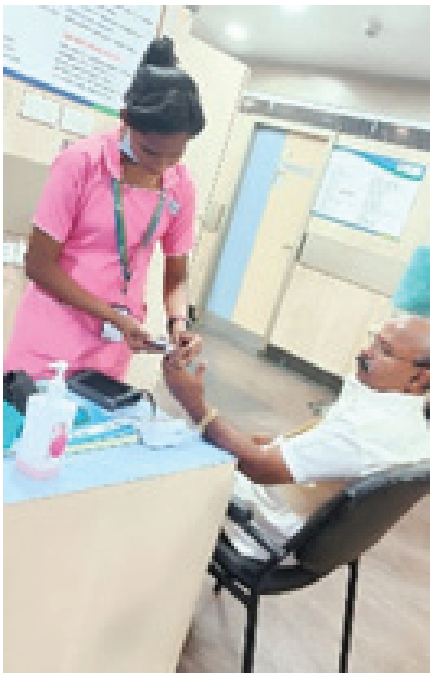
Extending Care to Those in Need More Camps, More Lives Saved

As we move forward, Billroth Hospital remains dedicated to its mission of making healthcare accessible to all. Billroth encourages collaboration with local communities, NGOs, and governmental bodies to create a comprehensive healthcare network that truly leaves no one behind.


கலைஞரின்
வரும்முன் காப்போம் திட்டம்
பில்ராத்

"World Diabetes Day" was "Free CBG Test Week" at Billroth Hospital.

On 14th November 2023, World Diabetes Day, we at Billroth Hospitals were thrilled for a heartening initiative. In the spirit of raising awareness and promoting proactive healthcare, Billroth Hospital offered free CBG (Capillary Blood Glucose) tests, empowering individuals to keep their sugar levels in check.



World Diabetes Week:

A Time for Reflection and Action

World Diabetes Week serves as a global platform to raise awareness about diabetes and its impact. Billroth Hospital seized this opportunity to contribute to the cause by offering free CBG tests throughout the week. Our commitment to preventive healthcare and community well-being drove us to provide a valuable service that can make a real difference in managing and preventing diabetes.

Real Stories, Real Impact

Numerous individuals took advantage of the free CBG tests offered by Billroth Hospital. We've received heartwarming feedback from individuals who benefited from the free CBG tests. These stories underscore the impact that simple, preventive measures can have on personal well-being.

PERIOD SHOULDN'T BE AN APOLOGY.

Get back your cramp-free life!

~~MRP-1800~~

Rs: 799

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R. A. Puram: 044-2464 1111

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