

# M.O.R.E. Journal

S U P P L E M E N T

MASTERLOC CASES REVIEW

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INSTITUTE  
MEDACTA ORTHOPAEDIC  
RESEARCH AND EDUCATION

 **asterLoc**<sup>®</sup>  
HIP SYSTEM

# Summary

SURGEONS' PERSPECTIVES	4
INTRODUCTION	5
CASE 1:	
SMALL FEMALE WITH A TYPE B FEMUR AND LIMITED AMOUNT OF OFFSET	6
JOSE A RODRIGUEZ, MD	
Hospital for Special Surgery, New York, New York	
CASE 2:	
71-YEAR-OLD FEMALE WITH A TYPE C FEMUR AND A SMALL AMOUNT OF OFFSET	7
JOHN MALTRY, MD	
Northwest Medical Center, Tucson, Arizona	
CASE 3:	
ELDERLY, 89-YEAR-OLD FEMALE WITH TYPE B FEMUR AND A SHORT VARUS NECK	8
EDWARD STOLARSKI, MD	
Sarasota Memorial Hospital, Sarasota, Florida	
CASE 4:	
MALE WITH TYPE C FEMUR AND A VALGUS NECK	9
EDWARD STOLARSKI, MD	
Sarasota Memorial Hospital, Sarasota, Florida	
CASE 5:	
TYPE A FEMUR WITH VARUS NECK AND HIGH OFFSET	10
JOSE A RODRIGUEZ, MD	
Hospital for Special Surgery, New York, New York	
CASE 6:	
TYPE B FEMUR WITH NECK REMODELING	12
MATTHEW BEAL, MD	
Northwestern Memorial Hospital, Chicago, Illinois	
CASE 7:	
TYPE B FEMUR WITH A FAIR AMOUNT OF OFFSET AND SHORT FEMORAL NECK	13
EDWARD STOLARSKI, MD	
Sarasota Memorial Hospital, Sarasota, Florida	

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**CASE 8:****TYPE A FEMUR WITH A SIGNIFICANT AMOUNT OF OFFSET****14****Mr. JUSTIN HUNT**

Epworth Richmond Private Hospital, Richmond, VIC, Australia

**CASE 9:****TYPE A FEMUR WITH A MODERATELY VALGUS NECK****15****Mr. JUSTIN HUNT**

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**CASE 10:****TYPE A FEMUR WITH A RELATIVELY HIGH OFFSET****16****Mr. JUSTIN HUNT**

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## Surgeons' Perspectives



*"The offset options with the MasterLoc Stem allow me to use this stem for very different population-based variations in femoral anatomy, from Japan, to Australia, to the Netherlands, to Peru; thereby optimizing function and stability in peoples from throughout the world right here in New York."*

Jose Rodriguez, M.D.



*"The MasterLoc stem gives me incredible versatility with three offset options within an 11 mm range. Whether it is avoiding increasing native offset of a valgus DDH neck, or matching the most extreme varus offset, the MasterLoc stem allows for recreating that patient's native biomechanics. This reduces trochanteric bursitis in the DDH patient, and avoids increasing leg length for stability in those patients with significant offset. Another nice option is having the ability to go to the next level of offset in the patient whose operative limb is long or equal pre-op. I can make them equal under flouro and clinically check stability. If unstable, I can add some offset instead of length. I have also been impressed by the uniform leg length as you increase offset, overall leg length does not change. It's a pure lateral move."*

*"I have been performing the anterior approach since 2005, and have used many flat tapered wedge stems and have always been challenged by the broach to implant mismatch. The stem frequently sits proud compared to the broach. I can honestly say that problem is virtually eliminated with the MasterLoc Hip System. The matched tolerance between the broach and the final implant is incredibly refreshing."*

Edward Stolarski, M.D.



*"I use the MIS anterolateral approach for all of my primary hip arthroplasty cases. As a high-volume hip surgeon I need a stem that is both versatile and highly reproducible. The MasterLoc is my go-to stem for these cases. The stem offers multiple sizes and three offset options. The instrumentation including the broach handles make using the stem possible in virtually all body types and bone morphology. The broach to stem relationship allows confident insertion of the stem with very low risk of femoral fracture. The bi-planar taper wedge stem design with MectaGrip coating provides initial stability and strong bone implant interface for long-term success."*

John Maltry, M.D.



*"Soft tissue impingement can be a problem on larger patients during the posterior approach. That impingement always threatens the final version of my femoral stem. The MasterLoc posterior broach handle is streamlined for the posterior approach to allow the surgeon to insert the broach without soft tissue impingement that could change femoral version during a posterior approach total hip."*

Matthew Beal, M.D.



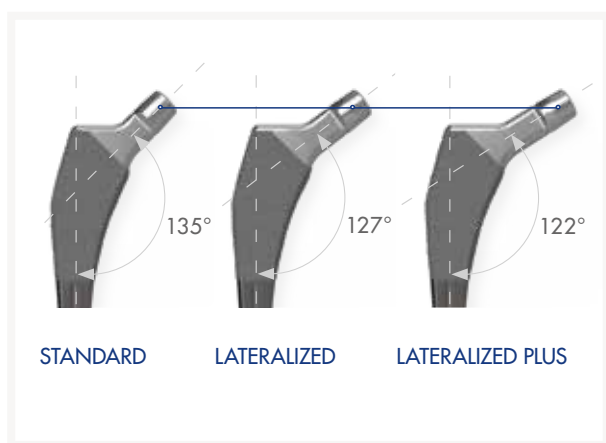
*"From my experience with over 300 MasterLoc THR cases, I've found the MasterLoc to be a versatile and reliable stem choice. With the provision of the extended offset range, the stem allows me to treat almost every variation in hip anatomy. Particularly, the blade stem enables type A femurs to achieve excellent results. I find the intraoperative final implanted result is what will remain with the patient- I haven't seen movement, subsidence or loosening with any of my patients implanted with MasterLoc"*

Mr. Justin Hunt

**Medacta International would like to express its gratitude to the surgeons who provided the MasterLoc cases described in this document.**

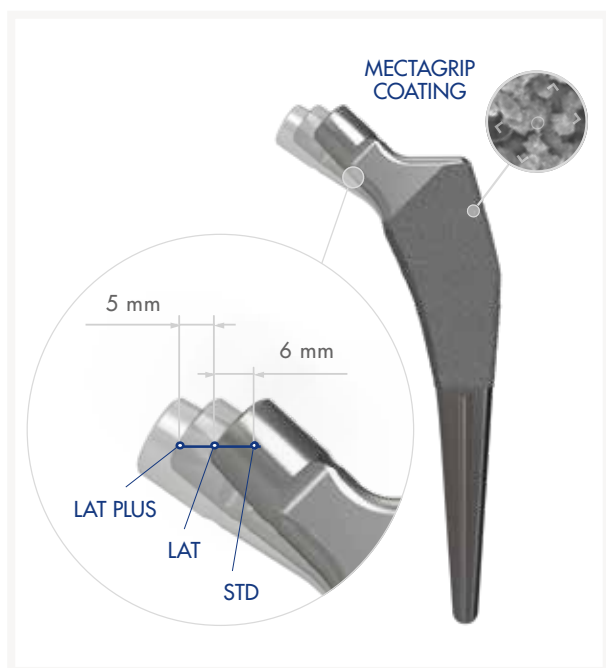
## Introduction

This document contains a collection of Total Hip Replacement case reviews that feature a variety of femoral anatomies and deformities, which have been treated with the MasterLoc femoral stem prosthesis. These cases highlight the adaptability of the MasterLoc Hip System in providing surgeons the ability to use a tapered wedge stem in almost all patient populations to match offset and restore leg length. The versatile implant options of the MasterLoc Hip System are matched with simple and intuitive instrumentation and the MyHip Patient Matched Technology with 3D preoperative planning and 3D printed patient-specific guides. Developed in 2015, the MasterLoc Hip System follows the well-proven concept of tapered wedge femoral stems, presenting a novel proximal coating and an optimized design suitable for all MIS procedures, especially the AMIS approach.



The MasterLoc Hip System is offered in three offset options (STD, LAT and LAT PLUS), providing 11mm of offset variation that does not affect leg length. The wide range of progressive sizing (1-14) allows surgeons to address a vast patient population, and works well in a variety of different bone morphologies, ranging from a small female with a short femoral neck, to a large muscular male with a valgus neck angle.

Leg length discrepancies remain one of the leading causes for patient dissatisfaction and litigation in hip replacement. Poor reconstruction of a patient's femoral offset may compromise adductors strength, the hip's range of motion, increase wear, and may be the cause of pain, which leads to decreased hip function<sup>[1,2]</sup>. The MasterLoc Hip System allows a surgeon to fine-tune leg length and offset to restore the patient's native hip joint biomechanics.



The MasterLoc Hip System holds true to the clinically proven Müller style flat tapered wedge stem design with a consistent medial curvature while growing laterally, proximally and distally as stem size increases. MasterLoc features a shortened stem length and a reduced distal geometry preserving bone, making it suitable for use with all bone morphologies, patient demographics, and surgeon operative techniques. These features have been introduced to enhance implant fit in the metaphysis while also enhancing performance in Dorr Type A, B and C femoral canals. These advances may also help prevent unexpected distal fixation<sup>[3]</sup>.

MasterLoc also features a proximal titanium plasma sprayed MectaGrip coating that provides enhanced initial stability, and proximal fill at the metaphyseal level. MectaGrip's high coefficient of friction and its continuously interconnected open pores with an optimized porosity increase the grip at the interface with bone. This also creates a favorable environment for bone, offering a mechanically stronger bone to implant interface, and potentially improving load transfer<sup>[4]</sup>.

Flat tapered wedge stems are one of the most prevalent stem types worldwide, regardless of surgical approach<sup>[5]</sup>. The MasterLoc Hip System's broach-only technique allows it to be used with a variety of minimally invasive approaches. Medacta has broach handles and other technique specific instrumentation to facilitate implanting the MasterLoc through a variety of surgical approaches.

Furthermore, the synergy of MasterLoc with MyHip Patient Matched Technology provides the surgeon with a comprehensive three-dimensional preoperative plan<sup>[6]</sup> and 3D printed patient-specific guides<sup>[7]</sup> to assist with implant selection and positioning<sup>[8]</sup>, thereby helping the surgeon to address the challenges in total hip replacement through a carefully planned procedure.

The case guide will review cases from surgeons performing AMIS as well as posterior and anterolateral approach, some of which have been performed in combination with MyHip Patient Matched Technology.

CASE I: Small female with a Type B femur and limited amount of offset

JOSE A RODRIGUEZ, MD - HOSPITAL FOR SPECIAL SURGERY, NEW YORK, NEW YORK

## 1. PRE-OPERATIVE

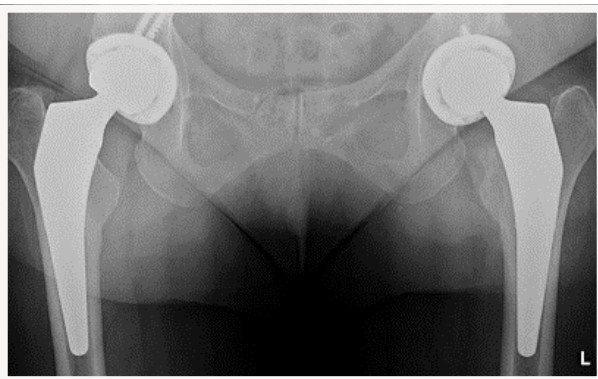
The patient is a 70-year-old female with a BMI of 36 and Dorr Type B femur. She presented with debilitating hip pain. 4 years prior, the patient had already undergone a successful THA on the right side. Conservative therapy had failed and she elected to undergo a total hip arthroplasty. The patient's native offset was 33 mm with the operative leg being approximately 1mm long. In the pre-operative planning the surgeon templated for a Size 8 MasterLoc STD with a 36mm diameter/+0mm offset femoral head.



### Pre-operative X-ray and planning

## 2. POST-OPERATIVE

The surgeon performed an anterior approach on this patient and the final implant was a Size 8 MasterLoc STD with a 36mm diameter/+0mm offset femoral head. This patient had very little offset and the MasterLoc STD stem provided the right amount of offset to stabilize the hip. This helped restore the patient's native hip biomechanics and follow-up radiographs demonstrated anatomic offset matching the contralateral side, while at the same time restoring leg length.



### Post-operative X-ray

## CASE 2: 71-year-old female with a Type C femur and a small amount of offset

JOHN MALTRY, MD - NORTHWEST MEDICAL CENTER, TUCSON, ARIZONA

### 1. PRE-OPERATIVE

The patient is a 71-year-old female with a three-year history of increasing pain and stiffness in the right groin. Pre-operative x-rays showed osteoarthritis in the right hip, grade IV changes and poor Dorr Type C bone quality. Pre-operative leg lengths are approximately equal. Patient also presented with osteoarthritis in the lumbar spine and 5° flexion contracture in the right hip.



Pre-operative X-ray and planning

### 2. POST-OPERATIVE

The surgeon performed an anterolateral approach on this patient. The final implant was a Size 8 MasterLoc STD with a +0mm offset, 36mm diameter head. The MasterLoc STD yielded excellent fit and fill in this Type C bone. The MasterLoc STD stem provided the correct amount of offset needed to stabilize the hip, in addition to restoring the patient's native leg length. At 6 weeks' post-op the patient was back on the golf course, resuming activities without restrictions.



Post-operative X-ray



## CASE 3: Elderly, 89-year-old female with Type B femur and a short varus neck

EDWARD STOLARSKI, MD - SARASOTA MEMORIAL HOSPITAL, SARASOTA, FLORIDA

### 1. PRE-OPERATIVE

The patient is an 89-year-old female presenting with right hip osteoarthritis. The patient presents with a Dorr Type B femur. The operative side leg length was 4mm shorter compared to the contra-lateral leg. Even though this patient has a long ilium pelvic flare, the short varus neck makes the operation a little more difficult. Another challenge with this patient at the age of 89 is the consideration to cement. However, in this case, the surgeon felt the MasterLoc was the best stem option because of his confidence in the MasterLoc's press-fit. The surgeon templated for a Size 4 MasterLoc STD and a femoral neck cut of 4mm.



Pre-operative X-ray and planning

### 2. POST-OPERATIVE

The surgery was performed using an anterior approach, with Size 4 MasterLoc LAT as the final implant. The surgeon originally trialed a STD neck, but there was not enough offset in the hip. Subsequent trial determined the offset of the LAT neck was a closer match to the contralateral hip. Ultimately, the patient had great range of motion, the hip was very stable, and post-op leg length was approximately equal.



Post-operative X-ray



## CASE 4: Male with Type C femur and a valgus neck

EDWARD STOLARSKI, MD - SARASOTA MEMORIAL HOSPITAL, SARASOTA, FLORIDA

### 1. PRE-OPERATIVE

The patient is a 77-year-old male presenting with right hip pain. X-rays showed arthritis of the right hip, with joint space narrowing, and a femoral head worn superiorly. The patient also presents with a Dorr Type C femur with a valgus femoral neck. Pre-operative leg length was approximately 3mm short compared to the contra-lateral side. The surgeon templated for a Size 11 MasterLoc STD, with a 12mm neck cut.



### 2. POST-OPERATIVE

The surgery was performed through the anterior approach and the final implant was a Size 12 MasterLoc LAT. The surgeon initially trialed a STD neck but there was not enough offset, and the hip felt unstable. The surgeon felt if he would have implanted a STD stem and used a +4mm offset head the operative hip would have been 4-5mm long. Ultimately, the LAT was the optimal choice allowing the surgeon to keep leg lengths equal and have stability with great range of motion.



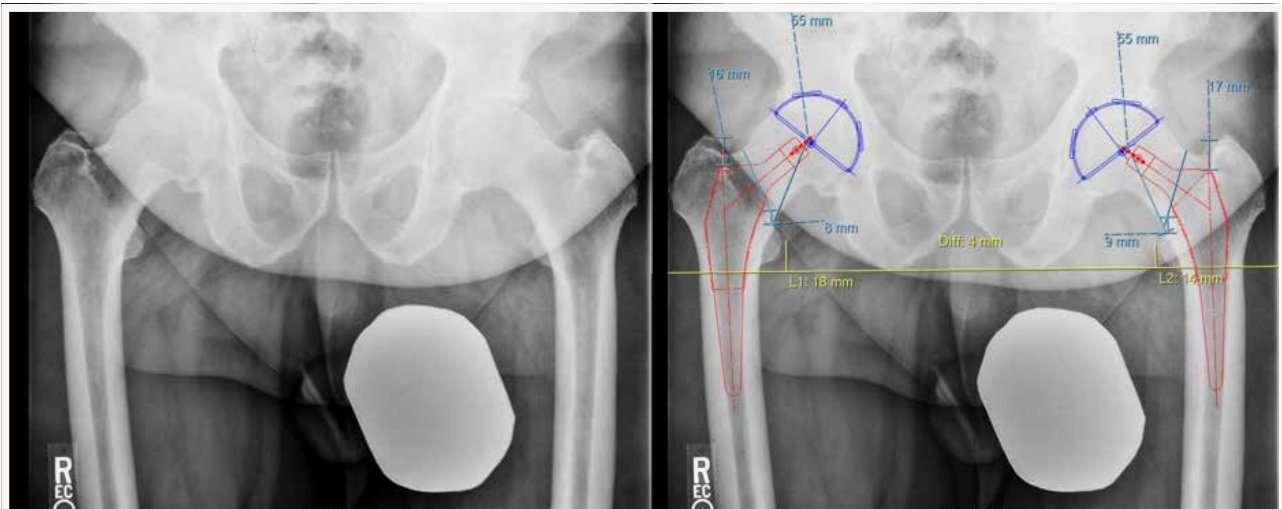
Post-operative X-ray

## CASE 5: Type A femur with varus neck and high offset

JOSE A RODRIGUEZ, MD - HOSPITAL FOR SPECIAL SURGERY, NEW YORK, NEW YORK

### 1. PRE-OPERATIVE

The patient is a young and active 65-year-old male undergoing a right total hip replacement. The patient is a competitive hockey player who presented with symptomatic osteoarthritis secondary to a cam deformity. The anatomical challenge is a Dorr Type A femur with a varus neck angle and significant amount of offset. Clinical and radiographic leg length inequality pre-operatively was 4mm shorter than the contralateral leg. The surgeon templated the patient to a Size 5 MasterLoc LAT with a +4mm offset femoral head.



Pre-operative X-ray and planning

### 2. INTRA-OPERATIVE

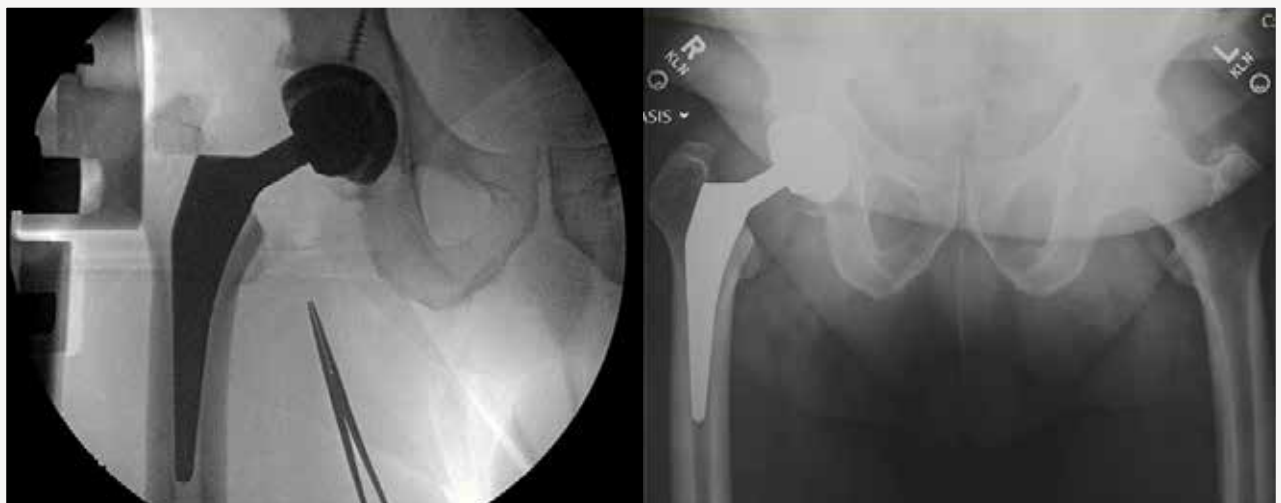
The surgery was performed using an anterior approach. The surgeon initially templated with a Size 5 MasterLoc LAT, but when trialing he felt there was not enough offset. He trialed with a +4 mm offset head, but the patient needed a little more offset, so the surgeon moved up to +8 mm offset head. Final trial determined that the LAT PLUS neck angle most closely matched the patients natural neck angle while providing the needed offset. The additional offset of the LAT PLUS stem was the optimal choice, allowing the surgeon to avoid having to use a skirted femoral head that could have potentially limited range of motion.



Intra-Operative X-ray

### 3. POST-OPERATIVE

The final implant is a Size 5 MasterLoc LAT PLUS. The availability of a LAT PLUS option allowed the surgeon to restore the patient's native hip biomechanics. The post-op follow-up radiograph demonstrates anatomic offset matching the contralateral side, restored leg length, and excellent endosteal implant-bone contact.



Post-operative X-ray

## CASE 6: Type B femur with neck remodeling

MATTHEW BEAL, MD - NORTHWESTERN MEMORIAL HOSPITAL, CHICAGO, ILLINOIS

### 1. PRE-OPERATIVE

The patient is a 68-year-old male undergoing a left total hip replacement. The patient presents with osteoarthritis. The patient has a Type B femur with varus neck. Patient presents pre-operatively 7mm shorter than the contralateral leg. The surgeon templated a Size 9 MasterLoc LAT PLUS which should re-create the patient's native length and offset. The LAT PLUS neck angle most closely matched the patients contralateral neck angle while providing the needed offset.



Pre-operative X-ray and planning

### 2. POST-OPERATIVE

The surgery was performed utilizing the posterior approach. As planned, the surgeon implanted a Size 9 MasterLoc LAT PLUS. The LAT PLUS stem helped restore the patient's native hip biomechanics. The LAT PLUS option with a 122° neck angle and additional offset was really appreciated by the surgeon, and made for a straight forward case for a patient with varus neck anatomy.



Post-operative X-ray

## CASE 7: Type B femur with a fair amount of offset and short femoral neck

EDWARD STOLARSKI, MD - SARASOTA MEMORIAL HOSPITAL, SARASOTA, FLORIDA

### 1. PRE-OPERATIVE

The patient is an 80-year-old male who presented with left hip pain for a number of years. X-rays showed osteoarthritis of the left hip. The patient has a Type B femur with varus neck. The operative side leg length was pre-operatively 1-2mm shorter than the contralateral side. The surgeon templated for a Size 8 MasterLoc LAT, with a 11mm femoral neck cut.



Pre-operative X-ray and planning

### 2. POST-OPERATIVE

The patient was operated using an anterior approach. The final stem implanted was a Size 9 MasterLoc LAT PLUS with a +0 mm offset, 40 mm diameter ceramic head. The surgeon first trialed a lateral neck with a -4mm offset, 40 mm diameter head but felt the hip was unstable, a few millimeters short, and the offset didn't quite match the contralateral hip. By having a third offset option (LAT PLUS) for this indication, the surgeon was able to achieve the offset necessary for stability while also matching the native offset of the patient. The hip had great range of motion, was stable, and the final leg length on the operative side was 1 millimeter long.



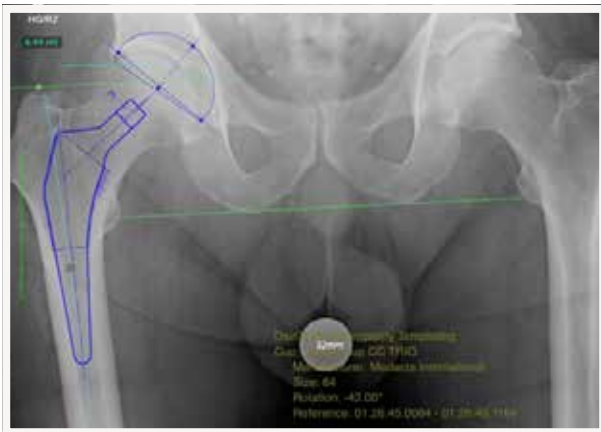
Post-operative X-ray

## CASE 8: Type A femur with a significant amount of offset

Mr. JUSTIN HUNT - EPWORTH RICHMOND PRIVATE HOSPITAL, RICHMOND, VIC, AUSTRALIA

### 1. PRE-OPERATIVE

The patient is a 73 year-old male undergoing a right total hip replacement. The patient experienced increasing groin pain over several years. MRI investigation confirmed moderate degenerative osteoarthritis. The patient has a Type A femur with significant offset.



Pre-operative X-ray and planning.

### 2. POST-OPERATIVE

The patient underwent a total hip replacement using an anterior bikini-incision approach. The final stem implanted was a Size 6 MasterLoc LAT PLUS with a 36mm diameter +4mm ceramic head. This combination allowed restoration of approximately 50mm. The immediate post-operative X-Ray is slightly oblique, however, restored offset and leg length are shown. The stem was an ideal fit for the canal.



Pre-operative X-ray and planning



Mr. JUSTIN HUNT - EPWORTH RICHMOND PRIVATE HOSPITAL, RICHMOND, VIC, AUSTRALIA

AP radiograph of the pelvis. A 32mm marker is visible in the center. A blue arc is drawn over the right femoral head, indicating the angle of the femoral head relative to the horizontal. The text "R" is in the top left corner.

15

## CASE 10: Type A femur with a relatively high offset

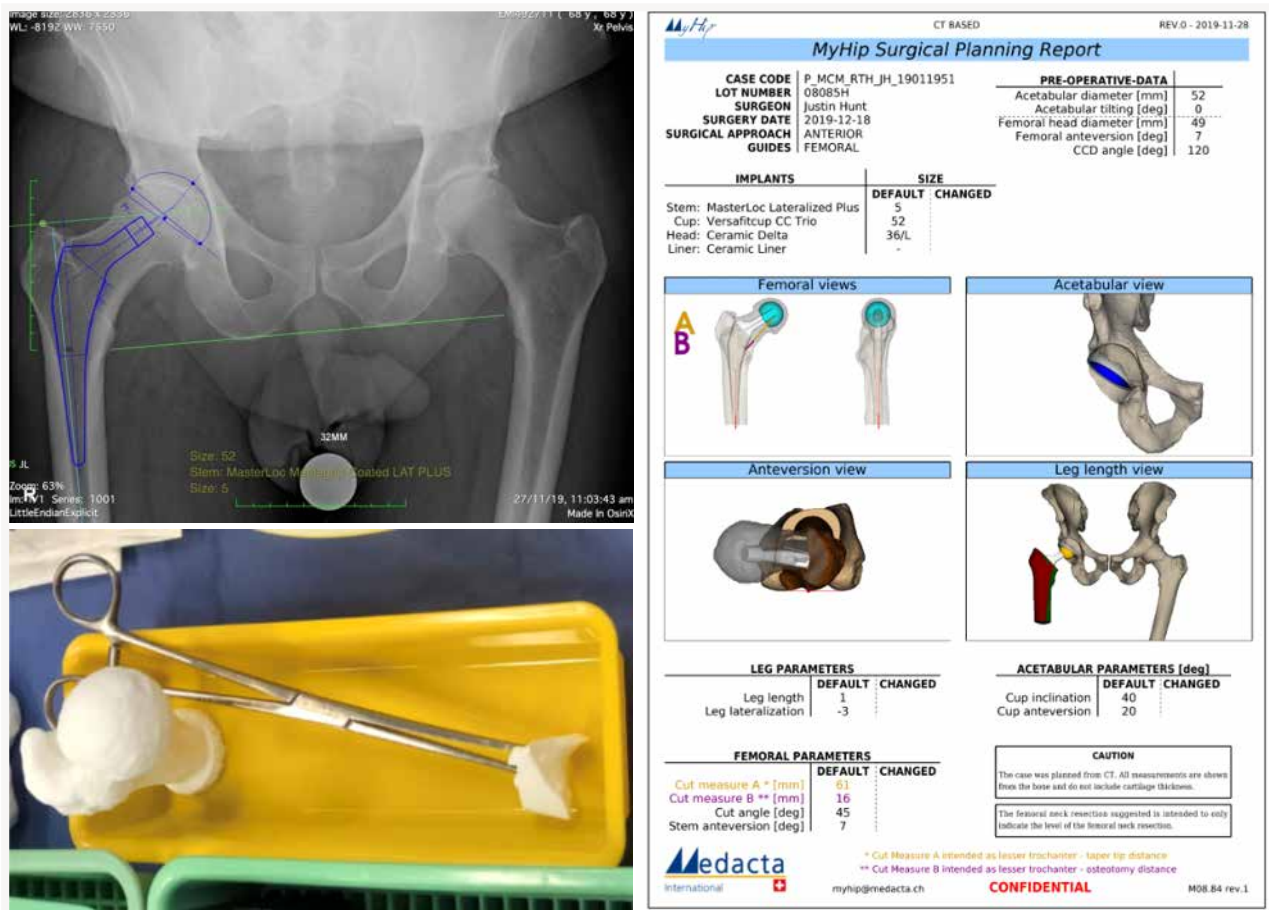
Mr. JUSTIN HUNT - EPWORTH RICHMOND PRIVATE HOSPITAL, RICHMOND, VIC, AUSTRALIA

### 1. PRE-OPERATIVE

The patient is a 69-year-old male undergoing a right total hip replacement. The patient presented with gradual worsening of hip pain; examinations confirmed osteoarthritis. The patient has a tight Type A femur canal and relatively high offset.

Starting from a pre-operative CT scan the patient's hip anatomy was 3-D reconstructed and the case was pre-operatively planned by the MyHip team in cooperation with the surgeon. A Size 5 Masterloc LAT PLUS with a +4mm offset femoral head (offset 46+4 ~49) was planned as the most appropriate implant as per patient's need and hip anatomy and biomechanics restoration.

On the basis of the approved plan, a MyHip 3D Printed Patient-Specific guide for anterior approach has been created to guide the surgeon intra-operatively in accurately reproducing the planned femoral cut.



Pre-operative X-ray; MyHip planning report and 3D Printed Patient-Specific guide

## 2. POST-OPERATIVE

The patient underwent a total hip replacement using an anterior bikini-incision approach. The final stem implanted was the same as was planned using MyHip technology. In comparison with XR templating software, MyHip provides a highly accurate depiction of the final implant sizing and offset/leg-length adjustments. In addition, the 3D printed bone models and cutting block allow intra-operative reproduction of planning by enabling reliable neck cut height and orientation in accordance with pre-planned measurements. The patient experienced a rapid recovery.



Post-operative X-ray

## NOTES

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