Results of Hip Arthroplasty Through Anterior, Lateral and Posterior Approaches; Systematic Review/Meta-Analysis

Submitted for Partial Fulfillment of Master Degree in Orthopaedic Surgery

Submitted by

Ahmed Saeed Yousef El-libodi

(M.B.B.CH)

Faculty of Medicine – Ain Shams University

Supervised by

Prof. Dr. Timour Fikry Al-Husseini

Professor of Orthopaedic Surgery

Faculty of Medicine – Ain Shams University

Dr. Sherif Mostafa Abd El-Dayem

Assistant Professor of Orhtopaedic Surgery

Faculty of Medicine – Ain Shams University

Faculty of medicine

Ain Shams University

2018

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH,** *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Timour Fikry Al-Husseini,** *Professor of Orthopaedic Surgery Faculty of Medicine – Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Dr. Sherif Mostafa Abd El-Dayem,** *Assistant Professor of Orhtopaedic Surgery Faculty of Medicine – Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

Ahmed Saeed Yousef El-libodi

Dedication

This work is dedicated to . . .

My beloved father, to whom I owe everything I ever did in my life and will achieve.

My mother for always being there for me and all the nights she stayed with me.

My new Family, Father in law and brothers and my late Mother in law whom I know she prays for us.

Finally my Fiancée for always supporting me

List of Contents

List of Tables

List of Figures

List of Abbreviations

Abb.	Full term
ASIS	*Anterior superior iliac spine*
BMI	*Body mass index*
GT	*Greater trochanter*
HHS	*Harris hip score*
M	*Muscle*
N	*Nerve*
PRISMA	*Preferred reporting items for systematic review and meta-analysis*
RCT	*Randomized control trial*
THA	*Total hip arthroplasty*
THR	*Total hip replacement*
VAS	*Visual analogue score*

INTRODUCTION

Total hip arthroplasty is used widely around the world as one of the most effective procedures for relieving pain, restoring hip function, and improving quality of life in patients with painful or deformed hip joints [1,2].

The development of modern total hip arthroplasty (THA) began in the 1950s with Charnley's low-friction arthroplasty [3,4]. After decades of improvement, THA is now one of the most reliable and patient requested surgical interventions. In 2010, an estimated 2.5 million individuals in the USA were living with THA, and nearly 332,000 THA were being performed annually [5,6]. A significant increase in THA demand is expected over the next several decades [7,8].

Improvements in hip arthroplasty procedures have led to faster functional recovery, shorter hospitalization, and higher patient satisfaction [9,10].

Except for perioperative managements, different approaches can also affect the clinical outcomes [11,12]. Each approach requires a thorough understanding of anatomy to optimize femoral and acetabular visualization, minimize complications and optimize patient outcomes.

There are 3 commonly used surgical approaches to the hip: the anterior, lateral (anterolateral (Watson-Jones) and direct lateral (Hardinge)).and poste.rior approaches. Each one is

different from the other in anatomy, technical aspects, outcome and complications figure (1). The operations can be performed in supine or in lateral position on standard or on trauma tables. More recently minimal invasive operating techniques (MIS) have been developed for all possible approaches in assumption that muscular damage is reduced and postoperative recovery is thus facilitated (Tab. I). However there is no current consensus regarding which approach is the most suitable.

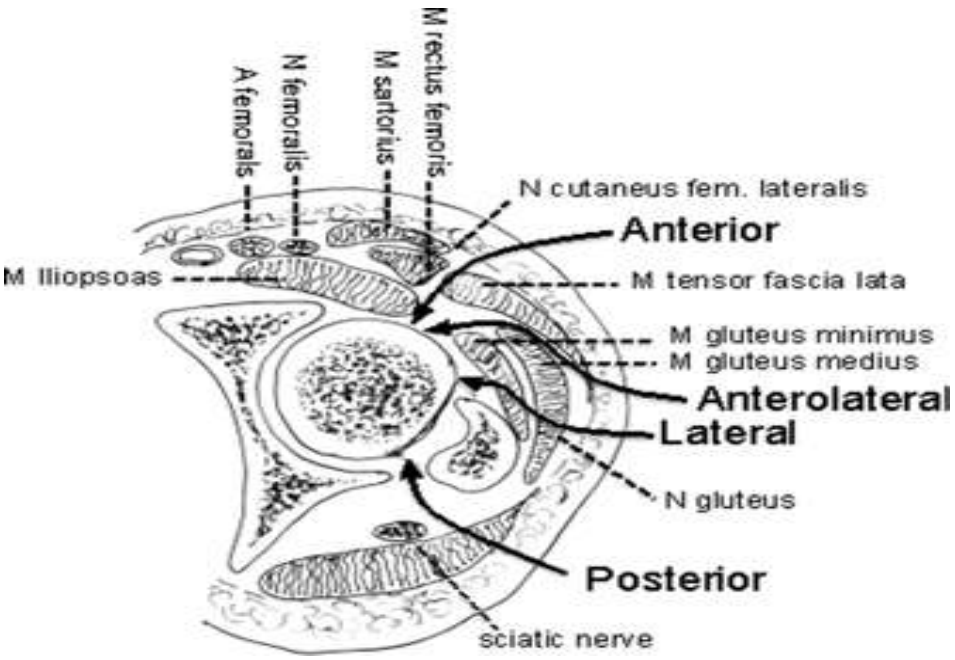

Figure (1): The posterior, lateral, anterolateral and anterior approach. Each approach has specific muscle groups that have to be mobilized and for each approach specific neurovascular structures are at risk [13].

Table (1): The most frequently used approaches in HIP replacements [13].

	Anatomic dissection	Authors	MIS authors
Posterior	Split of m. gluteus maximus	Langenbeck, Kocher, Moore	Wenz, Sculco, Roth, Nakamura
Lateral	Split of m. gluteus medius	Bauer, Hardinge, Learmonth	Berger, Higuchi
Anterolateral	Interval between m. gluteus medius and m. tensor fasciae latae	Watson Jones, McKee Farrar	Röttinger, Jerosch, Pfeil
Anterior	Interval between m. tensor fasciae latae and m. sartorius	Smith-Peterson, Hüter, Judet	Lesur, Keggi, Matta, Rachbauer

Direct anterior approach

The direct anterior approach to the hip was first described by Smith-Peterson in the 1940s, and was later modified by Heuter in the 1950s [14]. Internationally, this approach is gaining popularity in the hip arthroplasty community [15].

The patient is placed in supine position on a standard table or on a fracture table [16]. Incision made from anterior half of iliac crest to ASIS from ASIS curve inferiorly in the direction of the lateral patella for 8-10 cm figure (2).

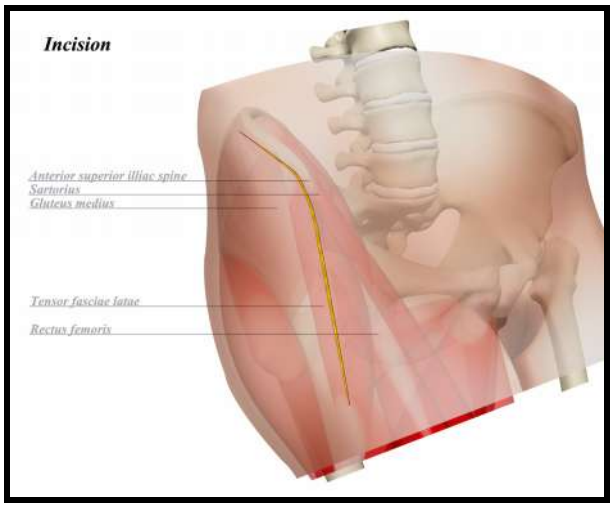

Figure (2): Direct anterior approach (Smith-Peterson) incision [17].

Internervous plane: Superficial between sartorius m. (femoral n.) and tensor fasciae latae m. (superior gluteal n.) Deep between rectus femoris m. (femoral n.) and gluteus medius m. (superior gluteal n.)figure (3).

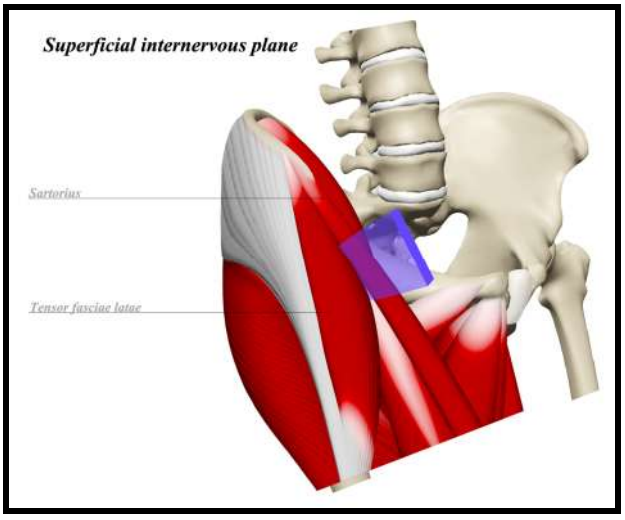

Figure (3): Internervous plane [17].

M. Sartorius, m. rectus femoris and m. iliopsoas on one side and m. tensor fasciae latae on the other side are mobilized and held back by retractors as shown in figure (4).

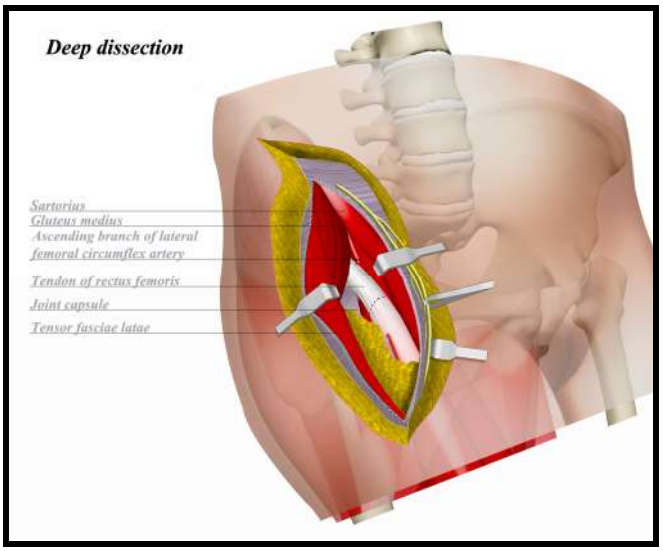

Figure (4): The interval between the rectus and gluteus medius is found, thereby exposing the joint capsule[17].

The femoral nerve and vessels are at risk if retractors are placed on the anterior rim of the acetabulum and the lateral branches of the femoral nerve are at risk when using caudal retractors.

During preparation and reaming parts of the m. tensor fasciae latae might be damaged.

The exposure of the acetabulum is good and it can be extended for acetabuar revisions but the posterior column can not be reconstructed. The femoral preparation is more difficult

and femoral revisions with osteotomies can not be performed using this approach.

Advocates of this approach consider its advantages to be the muscle-sparing nature of its internervous intervals, earlier restoration of gait kinematics and low dislocation rates [18-21]. The direct anterior approach can be performed with or without the use of a specialized table or fluoroscopy [22,23].

Lateral approach

The direct lateral approach to the hip was described by Hardinge in 1982 [24]. Approximately 60% of Canadian orthopedic surgeons perform THAs using a direct lateral approach [25].

The patient can be placed in a lateral or in a supine position.

Incision begin 5cm proximal to tip of greater trochanter longitudinal incision centered over tip of greater trochanter and extends down the line of the femur about 8cm figure (5).

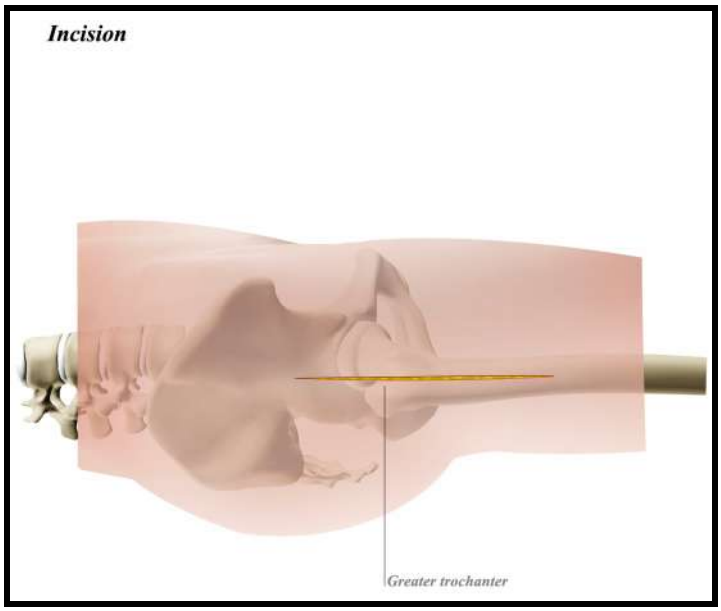

Figure (5): Lateral approach incision [26].

Various techniques are described to elevate the muscular bridge of the ventral portion of the gluteal muscles and the m. vastus lateralis [27]. In the anterolateral approach the m.vastus lateralis, in some variants, does not need to be detached [28]. Figure (7) & (8)