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Triple Innominate Osteotomy in Management of Residual Acetabular Dysplasia in Young Adolescent patients

A Systematic Review and Meta-Analysis

Submitted for Partial Fulfillment of master degree in **Orthopedic Surgery**

By

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Andrew Osama Refaat

Triple Innominate Osteotomy in Management of Residual Acetabular Dysplasia in Young Adolescent Patients (Systematic Review and Meta-Analysis)

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ABSTRACT

Background:

Aim of the Work: The aim of this work is to provide cumulative data about the efficacy and safety of triple innominate osteotomy in management of residual acetabular dysplasia in young adolescent patients.

Methods: This review was done using standard methodology outlined in the Cochrane Handbook and reported the findings in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses

Results: We found that; the total number of patients in all the included studies was 631 patients; while their average follow up time was (7.2 ± 4.6 years); with longest follow up time of 14.5 years. The average age of all patients was (12.67 ± 3.7 years); with youngest mean age of 7.5 years. Regarding Pre-operative assessment, the average CE angle was (10.4 ± 7.2) degrees, and the average HHS score was (77.7 ± 17.69) degrees.

Regarding Post-operative sequel, the overall complications rate was (184/631) (29.1%), and the overall AVN rate was (123/631) (19.5%).

Regarding 1ry efficacy outcome measures,

Conclusion: Acetabular dysplasia is among the anatomical abnormalities seen in developmental dislocation of the hip (DDH). One of the goals of surgical treatment during childhood is to achieve optimal femoral head coverage by correcting this architectural flaw, thereby preventing osteoarthritis. Pelvic osteotomy is a treatment option in children and adolescents with residual acetabular dysplasia after developmental dislocation of the hip.

Keywords: Triple Innominate Osteotomy, Residual Acetabular Dysplasia,. Adolescent Patients

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List of Abbreviations

Abb.	Full term
2D	*2-dimensional*
AIR	*Abduction–internal rotation*
ACEA	*Anterior center edge angle*
AIIS	*Anterior Inferior Iliac Spine*
ASIS	*Anterior Superior Iliac Spine*
BMI	*Body mass index*
CP	*Cerebral palsy*
DDH	*Development dysplasia of the hip*
LCEA	*Lateral center edge angle*
LCPD	*Legg-Calve-Perthes disease*
NSA	*Neck-shaft angle*
PAO	*Periacetabular osteotom*

INTRODUCTION

Regarding the hip, acetabular dysplasia is by far the most frequent, most researched and most successfully treated disorder. It presents as an isolated form or as a prerequisite for subluxation or complete hip dislocation (Developmental Dysplasia of Hip). Insufficient femoral head coverage may develop even in cases of a well-developed acetabulum due to the changes on the femoral head (Legg-Calve-Perthes disease, avascular necrosis of femoral head) [(1)].

The importance of early detection of the diseases lies in early staged treatment – preventive treatment, thus preventing the development of arthritis and preserving hip range of motion. There are different options of the non-operative treatment starting from the earliest age, while surgical treatment is considered only in cases of non-operative treatment failure or in patients with progressed disease. The triple pelvic osteotomy is the most effective surgical management of both dysplasia of the hip and secondary insufficient coverage of the femoral head. According to several authors, it is performed starting from the age of eight [(2)].

The aim for performing the procedure is to achieve adequate coverage of femoral head and increase congruence of hip joint for preserving hip range of motion and delaying of degenerative changes [*(2)*].

Some prerequisites must be fulfilled before surgery: the hip joint must be congruent, mobile (not stiff), not arthritic [(3)].

The triple pelvic osteotomy involves cutting of the pelvis in three places: pubic, ischial and iliac bone. According to the classic operating techniques it is done by three open incisions, and then adequately fixated, with an early start of rehabilitation then assisted weight bearing and walking is allowed. Throughout the history other methods have been also used, most frequently the Salter pelvic osteotomy, Dega , Ganz and the Chiari pelvic osteotomy – isolated or combined with corrective femoral osteotomy [4; 5].

The original triple pelvic osteotomy technique was published by Tonnis in 1979. Compared to the majority of other osteotomy techniques, the advantages of this triple osteotomy consist in the proximal osteotomy of the ischial bone, very close to the acetabulum. Since the osteotomies of the pubic and the iliac bone are also close to the acetabulum, the anterolateral rotation is possible and performed much easier than in other osteotomies [6].

The modification of the technique by Vladimirov (used in Egypt) consists of the anatomic access through two incisions (The first incision is to cut the ischial bone from a separate incision in the gluteofemoral fold, the second part of the operation is performed through a groin incision 8 to 12 cm long which gives an acceptable "bikini" scar for iliac pubic bones) thus sparing and allowing an easier and faster rehabilitation [7; 8].