Comparative Study
Between Salter & Dega Osteotomy
In Treatment of Acetabular Dysplasia

A Thesis Submitted for

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بسم الله الرحمن الرحيم

وما اوتيتم من العلم الا قليلا

صدق اللة العظيم

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ABSTRACT

Various pelvic innominate osteotomies have been described for the treatment of acetabular dysplasia secondary to congenital hip dysplasia.

The **goal** of pelvic osteotomy is to change the pathological mechanical environment that leads to secondary osteoarthrosis in patients with acetabular dysplasia.

Innominate osteotomies can be divided into two types: complete and incomplete transiliac osteotomies.

The osteotomie described by **(Salter, 1961),** is an example of complete transiliac osteotomies.

In 1969, Dega reported on what he called a transiliac osteotomy, which was actually an incomplete transiliac osteotomy.

Key words

Salter – Dega – pelvic osteotomy

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Aim of the work

The aim of this work is to compare the results between a group of patients with who underwent Salter osteotomy, and another, who underwent Dega osteotomy, both are accompanied with open reduction, and/or femoral shortening, and/or derotation osteotomy, in children between the ages of 1.5 - 3 years.

Introduction

Developmental dysplasia of the hip (DDH) refers to a range of developmental hip disorders that ranges from a hip that is mildly dysplastic, concentrically located, and stable, to one that is severely dysplastic and dislocated (1)**.**

In the pediatric orthopedic literature, **DDH** has gradually replaced the old term Congenital Dislocation of the Hip. This term realistically indicates a dynamic disorder, potentially capable of getting better or worse and occurring prenatally or postnatally. Developmental dysplasia of the hip is the preferred term to describe the condition in which the femoral head has an abnormal relationship to the acetabulum. This term includes frank dislocation (luxation), partial dislocation (subluxation), instability and an array of radiographic abnormalities that reflect inadequate formation of the acetabulum (2, 3, and 4).

There is general agreement that the earlier the diagnosis, the better the outcome. Early diagnosis is thought to improve outcome because non-surgical treatment can be used to optimize development of the hip joint. Despite this, however, some patients diagnosed early and treated conservatively may still require surgical intervention to obtain a stable reduction (5, 6).

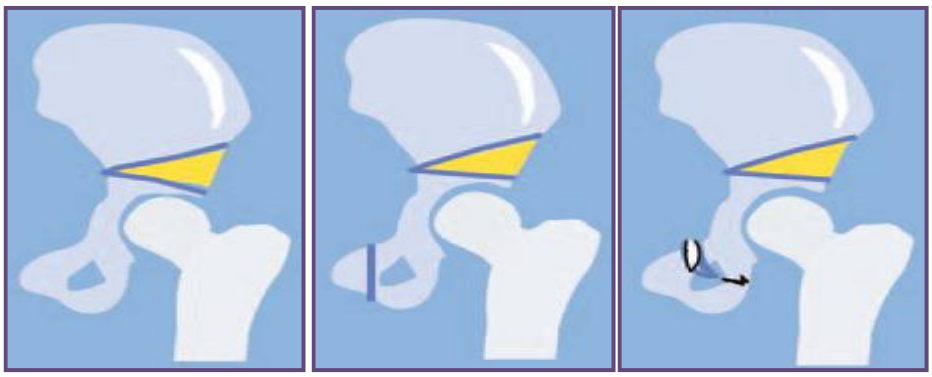
Surgical treatment of **DDH** includes open reduction plus capsulorrhaphy plus or minus pelvic and or femoral osteotomy.

Various pelvic innominate osteotomies have been described for the treatment of acetabular dysplasia secondary to congenital hip dysplasia.

The goal of pelvic osteotomy is to change the pathological mechanical environment that leads to secondary osteoarthrosis in patients with acetabular dysplasia. This might be achieved by improving coverage or congruity or both through either of two basic mechanisms. Either it increases the femoral head coverage by augmentation of the acetabular roof; or it changes the shape of the acetabulum (7).

Innominate osteotomies can be divided into two types: complete and incomplete transiliac osteotomies.

The osteotomies described by (Salter, 1961), (Sutherland, 1977) and (Steel, 1973) are examples of complete transiliac osteotomies. [Figure 1]

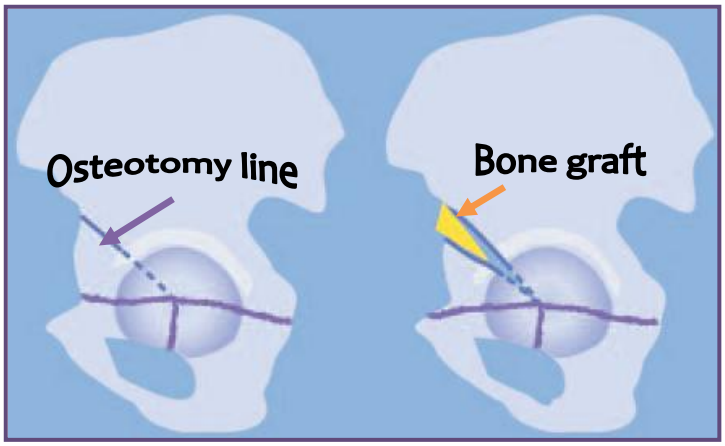


[Fig. 1] Salter osteotomy Sutherland osteotomy Steel osteotomy (8)

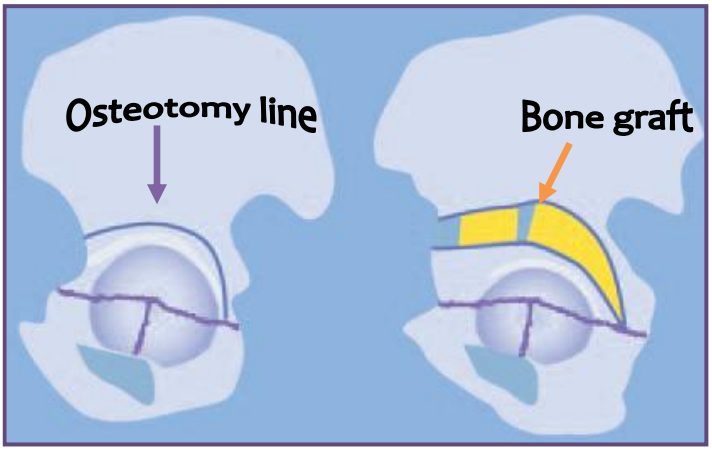
The most widely used incomplete transiliac osteotomy is that described by Pemberton in 1974**.** This osteotomy starts approximately 10 to 15 mm above the anterior inferior iliac spine, curves gently posteriorly, and ends at the level of the ilioischial limb of the triradiate cartilage halfway between the sciatic notch and the posterior part of the acetabular rim. The

osteotomy is believed to hinge at the triradiate cartilage, providing acetabular reshaping. Furthermore, since the caudal extension of the **Pemberton** osteotomy crosses the triradiate growth cartilage, there is a potential for growth arrest of the triradiate cartilage (8). **[Figure 2]**

In 1969, Dega reported on what he called a transiliac osteotomy, which was actually an incomplete transiliac osteotomy in which the cut penetrated the anterior and middle portions of the inner cortex of the ilium, leaving an intact hinge posteriorly consisting of the intact posteromedial iliac cortex and sciatic notch (9). **[Figure 3]**



[Figure 2] Pemberton osteotomy (8).



[Figure 3] Dega osteotomy (9)

Embryology

For normal growth and development of the hip joint to occur, there must be a genetically determined balance of growth of the acetabular and triradiate cartilages and a well-located and centered femoral head. Embryologically the femoral head and the acetabulum development from the same primitive mesenchymal cells.

Four weeks after fertilization, the small lower limb buds begins on the anterior lateral body wall at the lumbar and first sacral segment levels. These buds contain mesenchyme, which differentiate to cartilage, bone, synovium, ligaments, muscles and tendons. During about the seventh week of intrauterine life, a cleft develops, defining the future femoral head and acetabulum. By the eleventh intrauterine week**,** the hip joint is fully formed and hence this is the first time at which a dislocation may occur (2, 10).

INTRAUTERINE LIFE HAS BEEN DIVIDED INTO 3 PHASES

- **The initial period (ovular phase)**: Within the first weeks after fertilization, the ovum becomes well implanted in the endometrium.
- **The embryonic period**: The major differentiation of tissues and organs is accomplished from the end of the second week after fertilization up until the end of the eighth week. Bone and joints begin to develop in the embryonic period.
- **Fetal period**: From 8 weeks after fertilization to the termination of pregnancy, the tissue and organs that differentiated in the previous embryonic stage attain maturity. By the twenty week of gestation the fetus measures 170mm of length, and having reached the first half of

prenatal development, it has a completely differentiated and active hip joint. The femoral neck begins to elongate, and the head, which remains cartilaginous through out the fetal period (ossification begins 4-6 months after birth) measures 7 mm in diameter. At this time growth and maturation of the normal hip depends mainly on the effect of position and pressure as well as the stimulus of the concentric motion (2).

In the normal hip at birth, the femoral head deeply seated in the acetabulum and held within the confines of the acetabulum by the surface tension of the synovial fluid. It is extremely difficult to dislocate a normal infant hip**,** even after incising the hip joint capsule (11, 12)**.**

POSTNATAL DEVELOPMENT OF THE HIP JOINT

Growth of the proximal femur

At birth, there is a single chondroepiphysis of the proximal end of the femur. Between the fourth and seventh months of life, the proximal femoral secondary ossification center appears. This osseous centrum continues to enlarge, along with its cartilaginous anlage, until adult life, when only a thin layer of articular cartilage remains. The proximal part of the femur and the trochanter enlarge by appositional cartilage-cell proliferation.

The three main growth areas in the proximal part of the femur are the physeal plate, the growth plate of the greater trochanter, and the femoral neck isthmus (13)**. [Figure 4]**

[Figure 4] The proximal part of the femur of the infant has three physeal plates (13)