Subtrochanteric Corrective Osteotomy by Monolateral Fixator in Children

Thesis

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By

Mohamed Hamdy Abd ELHamid
M.B.B.Ch., Mansoura University
M.Sc. Orthopedics, Ain Shams University

Supervised by

Prof .Dr. Hassan M.El Barbary

Professor of orthopedics
Faculty of Medicine
Cairo University

Prof .Dr. Mohamed M.Hegazy

Professor of orthopedics
Faculty of Medicine
Cairo University

Dr. Ahmed M.Doheim
Lecturer of orthopedics
Faculty of Medicine
Cairo University

Cairo University
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Abstract

Coxa vara, coxa valga or excessive anteversion of the femoral neck are well-known pediatric hip disorders that are associated with triplanar deformity of the proximal femur.

Several techniques of proximal femoral osteotomies have being cited in the literature with variable outcomes. Recently, a percutaneous technique with application of an external fixator for acute opening wedge osteotomy has been described in the correction of the proximal femoral deformities.

In the period between February 2014 and January 2016, a prospective study was conducted involving 26 patients (30 hips) with proximal femoral deformities with an average age of 7 years (range 4-11 years). For whom we performed valgus or varus subtrochanteric osteotomy with or without derotation osteotomy and were followed up in Abo El Reesh children's hospital.

Key Words :

Coxa Vara - Neck-Shaft angle - Range of Motion - Slipped capital femoral epiphysis - Limb Length Discrepancy.

﴿ قـالوا سبحـانك لا علم لنـا إلا مـا علمــتنا إنــك أنــت العليـــم الحكيــم﴾

"صدق الله العظيم"
سورة البقرة آية رقم (32)

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ABBREVIATIONS

- **AI** : Acetabular index
- **AP** : Antero-posterior
- **ATD** : Articulo-Trochanteric distance
- **CP** : Cerebral palsy
- **CT** : Computed tomography scans
- **DCV** : Developmental coxa vara
- **H-E angle** : Hilgenreiner-Epiphyseal angle
- **LCP** : Locked compression plate
- **LLD** : Limb Length Discrepancy
- **N-S angle** : Neck-Shaft angle
- **NWB** : Non weight bearing
- **ROM** : Range of motion
- **SCFE** : Slipped capital femoral epiphysis
- **SS** : Sourcil slope

Introduction

Femoral osteotomy can be performed in the inter- or subtrochanteric area to redirect the femoral head more superiorly (valgus) or inferiorly (varus) and/or for rotational correction of excessive medial femoral torsion (anteversion). The plate and screws are commonly used, but an external fixator and/or spica cast may be placed instead. [1,2]

Monolateral fixator is preferable because it is more rigid, minimally invasive, has a short operative time, with minimal blood loss due to small incision osteotomy, less soft tissue trauma and periosteal stripping, as well as the fact that internal fixation is not used. Caregivers of all patients are satisfied with results of surgery and reported improvement in perineal care, diaper changes and transfers and pain improvement. [3,4]

Since Keetly performed the first subtrochanteric valgus-producing osteotomy in 1888, many variations in the technique have been described with variable success and high recurrence rates. [5] There are several pitfalls with the current techniques of proximal femur osteotomies which include the necessity of open procedures with removal of a trapezoidal fragment of bone from the subtrochanteric area, leading to increased blood loss as well as further shortening of a usually shortened extremity.[6,7,8]

Achieving correction of limb deformities and length discrepancies through less invasive means is becoming increasingly popular. Recently, good results using external fixator systems have been reported for the correction of proximal femoral deformities. [9]

Aim of the Work

This prospective study is performed to evaluate the results of percutaneous subtrochanteric osteotomy in restoring the normal length, rotation and alignment, thereby restoring the normal mechanics of the hip joint, overcoming the limb shortening, and reestablishing the length–tension relationship of the abductor muscles in the coronal plane, axial plane or sagittal plane deformities of the hip joint in children.

Review of literature

Significant changes have occurred recently in fixation methods following fracture or osteotomy in children and teenagers. Children have benefited the most from these advances. These new methods reduce the immobilization period and allow autonomy to be regained more quickly, which is especially important in children with neurological impairment. A child's growth is anatomically and physiologically ensured by the growth plate and periosteum. The need to preserve the growth plate, which is well known in pediatric surgery provides an alternate means of fixation between K-wires and screws (now cannulated) and have contributed to the development of minimally invasive surgical techniques such as external fixators which are used in treatment of varieties of diseases such as coronal plane, axial plane or sagittal plane deformities of the hip in children.

Coxa Vara

Definition*:*

Coxa vara is a varus deformity of the femoral neck. It is defined as the angle between the neck and shaft of the femur is less than 110 – 120 ° (which is normally between 135 ° - 145 °) in children. [10]

Coxa vara is classified into several subtypes:

- Congenital coxa vara is present at birth and is caused by an embryonic limb bud abnormality.
- DCV occurs as an isolated deformity of the proximal femur. It tends to go unnoticed until walking age is reached, when the deformity results in a leg length difference or abnormal gait pattern.