



Management of Slipped Capital Femoral Epiphysis using Surgical Dislocation Technique

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Degree in Orthopaedic surgery

By

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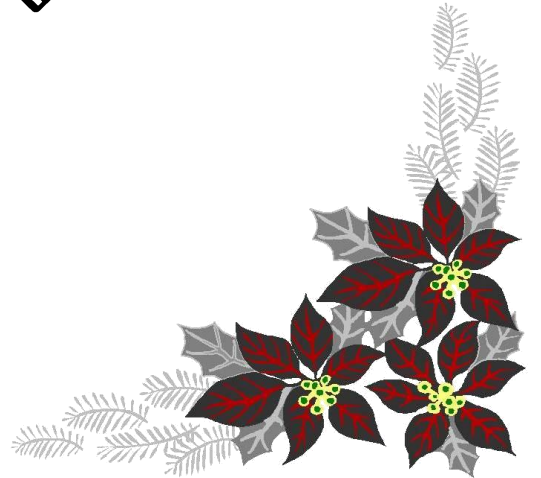


بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"قَالُوا سُبْحَانَكَ لَا عِلْمَ
لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ
أَنْتَ الْعَلِيمُ الْحَكِيمُ"

صَدَقَ اللَّهُ الْعَظِيمُ

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LIST OF CONTENTS

Title	Page No.
INTRODUCTION	1
AIM OF THE ESSAY	4
BLOOD SUPPLY OF THE FEMORAL HEAD	5
ETIOLOGY AND PATHOGENESIS OF SCFE	14
MANAGEMENT	30
SURGICAL DISLOCATION TECHNIQUE IN TREATMENT OF SCFE	63
Indications	63
Technique	69
Results	95
Complications	100
SUMMARY	105
REFERNCES	107
ARABIC SUMMARY	-

LIST OF FIGURES

Fig. No.	Title	Page No.
1	Arterial Supply of the proximal femur.	7
2	Anteroposterior radiograph made at the age of five years and two months. There is now loss of the lateral pillar with lucency of the femoral head.	32
3	Anteroposterior radiograph of a five-year-old girl with left developmental dysplasia of the hip.	34
4	Anteroposterior radiographs showing the metaphyseal blanch sign and Klein's line.	37
5	Abnormal physis taken of a 10-year-old boy with slipped capital femoral epiphysis (SCFE) on both sides.	39
6	A ten-year-old boy with a stable (chronic) mild slipped capital femoral epiphysis involving the left hip.	41
7	Radiograph of an eleven-year-old girl with left slipped capital femoral epiphysis showing the posterior sloping angle (PSA).	44
8	Illustration showing the location of the anterior-based trapezoid wedge of bone that is removed from the metaphysis of the femoral neck during the cuneiform osteotomy.	50
9	Radiograph showing pinning in situ of SCFE.	53
10	Illustration showing the technique for performing an open epiphyseodesis.	56
11	Osteotomies for Slipped Capital femoral epiphysis.	57
12	Anteroposterior pelvis radiograph demonstrating significant displacement of the epiphysis.	64
13	Illustration of the femoral neck during surgical dislocation	67
14	The patient is placed in the lateral decubitus position.	71
15	The piriformis tendon, running toward the piriformis fossa, is revealed.	74

Fig. No.	Title	Page No.
16	Posterior aspect of the greater trochanter. Electrocautery is used to mark the osteotomy path.	75
17	Greater trochanteric osteotomy in a right hip.	76
18	The osteotomy progresses posterior to anterior across the greater trochanter toward the vastus ridge.	76
19	An osteotome should be used to complete the osteotomy at the anterior cortex instead of the sagittal saw	78
20	Remaining posterior fibers of the gluteus medius should be incised from the trochanteric remnant.	78
21	Exposure of the hip capsule.	80
22	In the “z” shape capsulotomy, the initial incision is made longitudinally down the neck along the posterior aspect of the iliofemoral ligament	81
23	Second limb of “z” capsulotomy – extending posteriorly along capsulolabral junction.	81
24	A third capsulotomy limb extends medially along the anterior aspect of the neck.	82
25	In situ pinning of the epiphysis. The hip has been dislocated after the epiphysis was pinned in situ to prevent displacement.	83
26	Elevating the periosteum on the femoral neck. The periosteum is elevated both medially and laterally.	84
27	Mobilization of the stable trochanter.	85
28	Mobilization of the medial and lateral periosteum from the femoral neck.	85
29	Mobilization of the epiphysis.	86
30	Trimming of the femoral neck and callus.	87
31	Femoral neck shortening.	88

Fig. No.	Title	Page No.
32	Squaring of the medial femoral neck.	88
33	Resection of posterior callus.	89
34	Pinning of the reduced epiphysis.	90
35	Final screw fixation. Coronal view of the hip.	92

LIST OF ABBREVIATIONS

SCFE	: Slipped Capital Femoral Epiphysis
AVN	: Avascular Necrosis
MFCA	: Medial Femoral Circumflex Artery
GH	: Growth Hormone
ASIS	: anterior superior iliac spine
AIIS	: anterior inferior iliac spine
FAI	: Femeroacetabular Impingement
BMI	: Body Mass Index
Ig M	: serum immunoglobulins M
IGF-1	: Insulin growth factor-1

INTRODUCTION

Slipped capital femoral epiphysis (SCFE) is the most common disorder of the hip in young adolescents. This disorder involves the progressive displacement of the proximal femur through the open growth plate.⁽¹⁾

In most children with SCFE, the precise etiology is unknown. Regardless of the underlying etiology. Conditions that weaken the physis include endocrine abnormalities, systemic disease (such as renal osteodystrophy), and previous radiation therapy in the region of the proximal femur (Atypical SCFE).⁽²⁾

SCFE is classified as pre-slip, acute, chronic and acute on chronic.⁽³⁾ or classified as stable and unstable based on the stability.⁽⁴⁾ Kallio classification depends on the presence or absence of a hip effusion by ultrasound images,⁽⁵⁾ It is also classified as mild, moderate and severe based on epiphyseal shaft angle.⁽⁶⁾

Patients with slipped capital femoral epiphysis usually have weak hip abductors and the affected leg may appear shorter. When range of motion is performed, pain may not be elicited until the extreme ranges are reached. Walking will usually result in knee

pain. Most signs of slipped capital femoral epiphysis evolve slowly over many months. ⁽⁷⁾

A good history and physical examination should be considered for all newly diagnosed cases of SCFE to elicit who are with high risk. ⁽⁸⁾ Delayed diagnosis is with increased slip severity. ⁽⁹⁾

The goals of treatment in SCFE are early detection and prevention of further slipping, and avoidance of complications. Although attention is often focused on the affected hip, care of the unaffected hip (either through careful observation or through prophylactic treatment) cannot be forsaken. ⁽¹⁰⁾ Treatment is virtually always surgical. ⁽¹⁾

Complications of SCFE may occur immediately or later. The late complications include Osteoarthritis (OA), Avascular necrosis (AVN) and chondrolysis. ⁽¹¹⁾

Ganz surgical hip dislocation is useful in the management of severe hip diseases, providing an unobstructed view of the femoral head and acetabulum. ⁽¹²⁾

Most pediatric hip diseases are treated by extra-articular procedures, such as soft tissue release, proximal femoral osteotomy, or pelvic osteotomy. However, sometimes a direct

approach to the femoral head or acetabulum is indicated in serious conditions or residual stages in which further remodeling cannot be expected. The surgical hip dislocation approach proposed by Ganz et al. is very useful in such cases. This approach enables preservation of the femoral head blood supply and allows for a direct approach to the intra-articular lesion as well as the underlying pathology.⁽¹³⁾

The hip joint can be surgically dislocated using other approaches. However, the Ganz method of surgical hip dislocation has several advantages. As the abductor is detached by trochanter flip osteotomy, rigid fixation of this flip fragment by screws restores immediate stability and allows for early mobilization of the patient. Moreover, by replacing this fragment to a point other than the osteotomy site, a trochanter transfer effect can be achieved if necessary. When flexion-valgization osteotomy is performed for SCFE patients, hip abductor alignment with the femoral shaft can be maintained by replacing the flip osteotomy fragment aligned with the distal fragment rather than the proximal one.⁽¹²⁾

AIM OF THE ESSAY

The purpose of this study is to review the different methods of diagnosis and treatment of slipped capital femoral epiphysis emphasizing on surgical dislocation as a line of surgical treatment.

BLOOD SUPPLY OF THE FEMORAL HEAD

The capsule of the hip is attached anteriorly at the intertrochanteric line, but posteriorly, the lateral half of the femoral neck is extra-capsular. ⁽¹⁴⁾

Vascular anatomy of the upper femur:

-It comes from 3 groups (fig.1). ⁽¹⁵⁾

1-The extra capsular arterial ring:

It's formed posteriorly by a large branch of the medial femoral circumflex artery, and anteriorly by branches of the lateral femoral circumflex artery, the superior and inferior gluteal arteries also have minor contribution to this ring. ⁽¹⁵⁾

2-The ascending cervical branches (Intra-osseous):

They are raised from extracapsular ring anteriorly, they penetrate the capsule of the hip joint at the intertrochanteric line, and posteriorly, they pass beneath the orbicular fibers of the capsule. They pass upward under the synovial reflections and fibers prolongation of the capsule toward the articular cartilage that demarcates the femoral head from its neck. These arteries are

known as retinacular arteries. The proximity of these arteries to bone put them at risk for injury in any fracture of femoral neck.⁽¹⁶⁾

The ascending cervical arteries can be divided into four groups (anterior, medial, posterior and lateral) based on their relationship to femoral neck. On these four groups, the lateral group provides most important blood supply to the femoral head. At the margin of the articular cartilage on the surface of the femoral neck the four groups of the ascending cervical arteries form second ring which termed subsynovial intra-articular ring which can be complete or incomplete, depending on anatomical variation.⁽¹⁶⁾

As the superficial cervical arteries pass over the neck, they send many small branches into the metaphysis of the femoral neck. The metaphysis is also supplied by the extra-capsular arterial ring. In adults the epiphyseal and metaphyseal blood vessels make anastomosis with each other intraosseously after closure of the epiphysis.⁽¹⁶⁾

3-Ligamentum teres artery:

The ligamentum teres artery is a branch of the obturator artery or medial femoral circumflex artery. Although the vessels of the ligamentum teres supply vascularity to the femoral head they were often inadequate to assume the major nourishment of the femoral head after a displaced fracture. There is anastomosis between vessels in ligamentum teres and other arteries of the head and neck.⁽¹⁵⁾

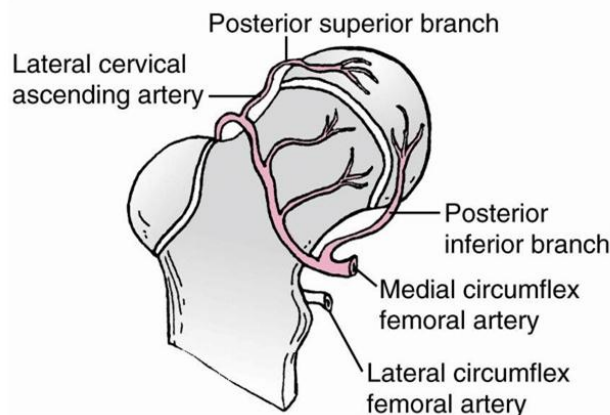


Fig. (1): Arterial Supply of the proximal femur. The capital femoral epiphysis and physis are supplied by the medial circumflex artery through two retinacular systems: the posterosuperior and posteroinferior. The lateral circumflex artery supplies the greater trochanter and the lateral portion of the proximal femoral physis and a small area of the anteromedial metaphysis.⁽¹⁵⁾