Congenital Knee Dislocation

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PEDIATRIC ORTHOPEDICS

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Congenital Knee Dislocation

- Introduction.
- Etiology and Risk Factors.
- Anatomy and Pathophysiology.
- Diagnosis.
- Classification.
- Management.
- Summary.

Introduction

- **Congenital knee dislocation (CKD)** is a rare condition present at birth.
- Characterized by **hyperextension** and **anterior displacement of the tibia.**
- Incidence: **1 in 100,000** live births.
- (F:M): 3:1
- Bilateral in 33%.

Etiology

- **Idiopathic**

- **Genetic / Syndromic:**

  - a) Larsen's syndrome
  - b) Arthrogryposis
  - c) Ehlers-Danlos syndrome

- **Paralytic:**

  - Spina bifida

Associated Deformities

- (DDH): Present in 50% of cases.
- (TEV/Clubfoot): Present in 31% of cases.

Etiology and Risk Factors

- Intrauterine mechanical factors: breech position, oligohydramnios.

- Genetic factors and syndromic associations.

- Quadriceps muscular fibrosis.

Anatomy and Pathophysiology

➢ Direction of Dislocation:

- Always anterior (tibia sublaxed anteriorly).
- May be lateral with valgus deformity of knee.

➢ **Affected Structures:**

- Quadriceps fibrosis & contracture due to:

1. Intrauterine ischemia
2. Mechanical due to shortening

- Contracture of anterior capsule
- Absent suprapatellar pouch
- Ilio-tibial band dislocated anterior
- Underdeveloped patella
- Absent cruciate ligaments
- Delayed/absent ossification of knee epiphyses

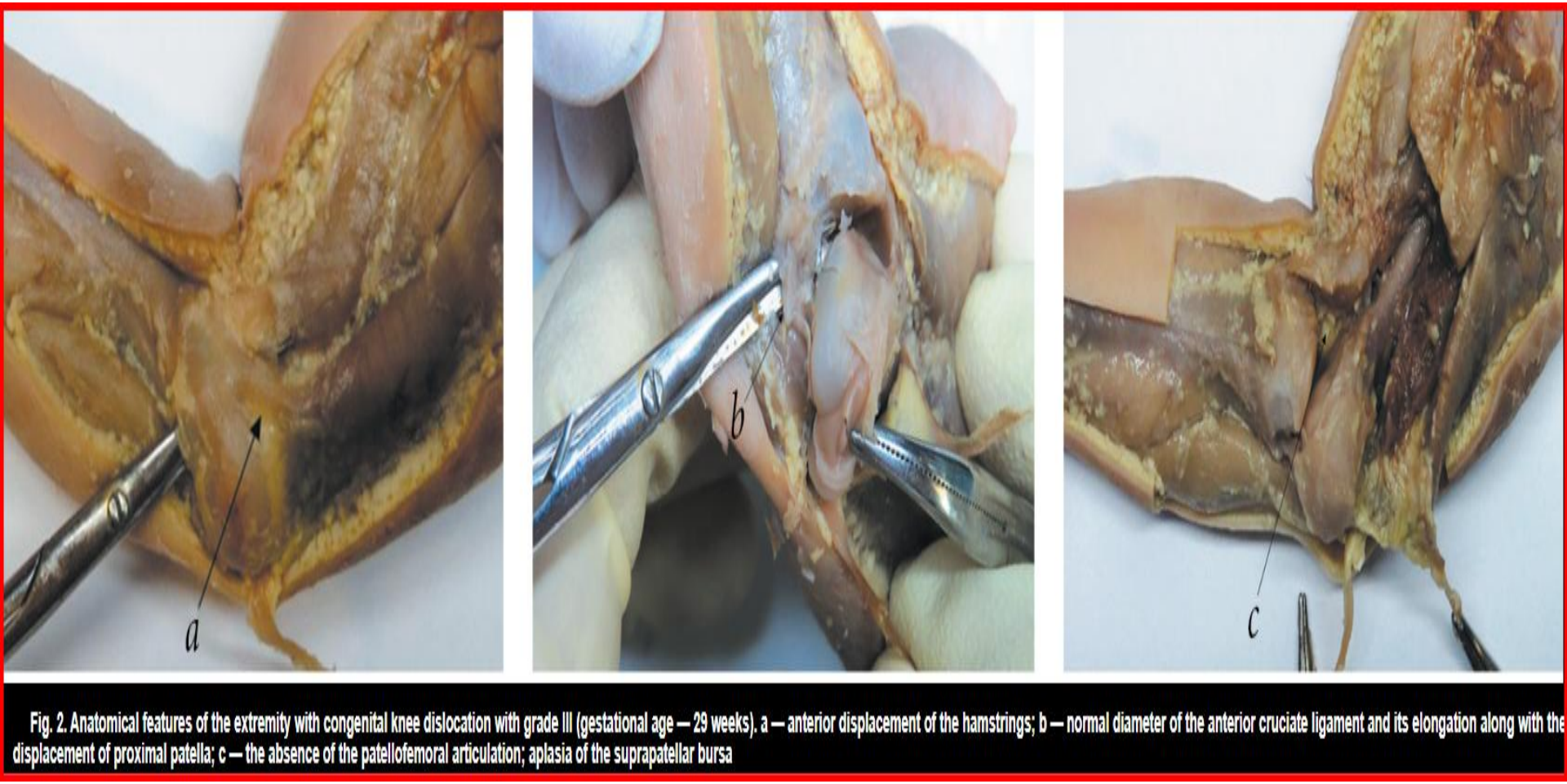


Fig. 2. Anatomical features of the extremity with congenital knee dislocation with grade III (gestational age — 29 weeks). a — anterior displacement of the hamstrings; b — normal diameter of the anterior cruciate ligament and its elongation along with the displacement of proximal patella; c — the absence of the patellofemoral articulation; aplasia of the suprapatellar bursa

Diagnosis

❑Clinical Exam:

- Hyperextended knee, palpable femoral condyles posteriorly.

❑Imaging:

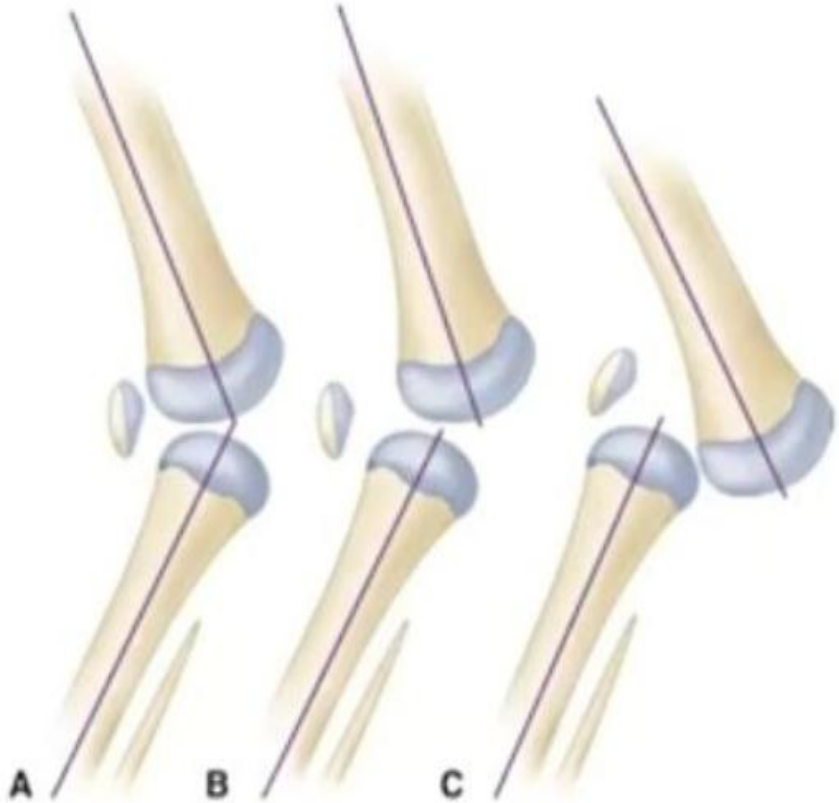
- - Ultrasound (early diagnosis)
- - X-ray (confirmation after ossification)

Classification

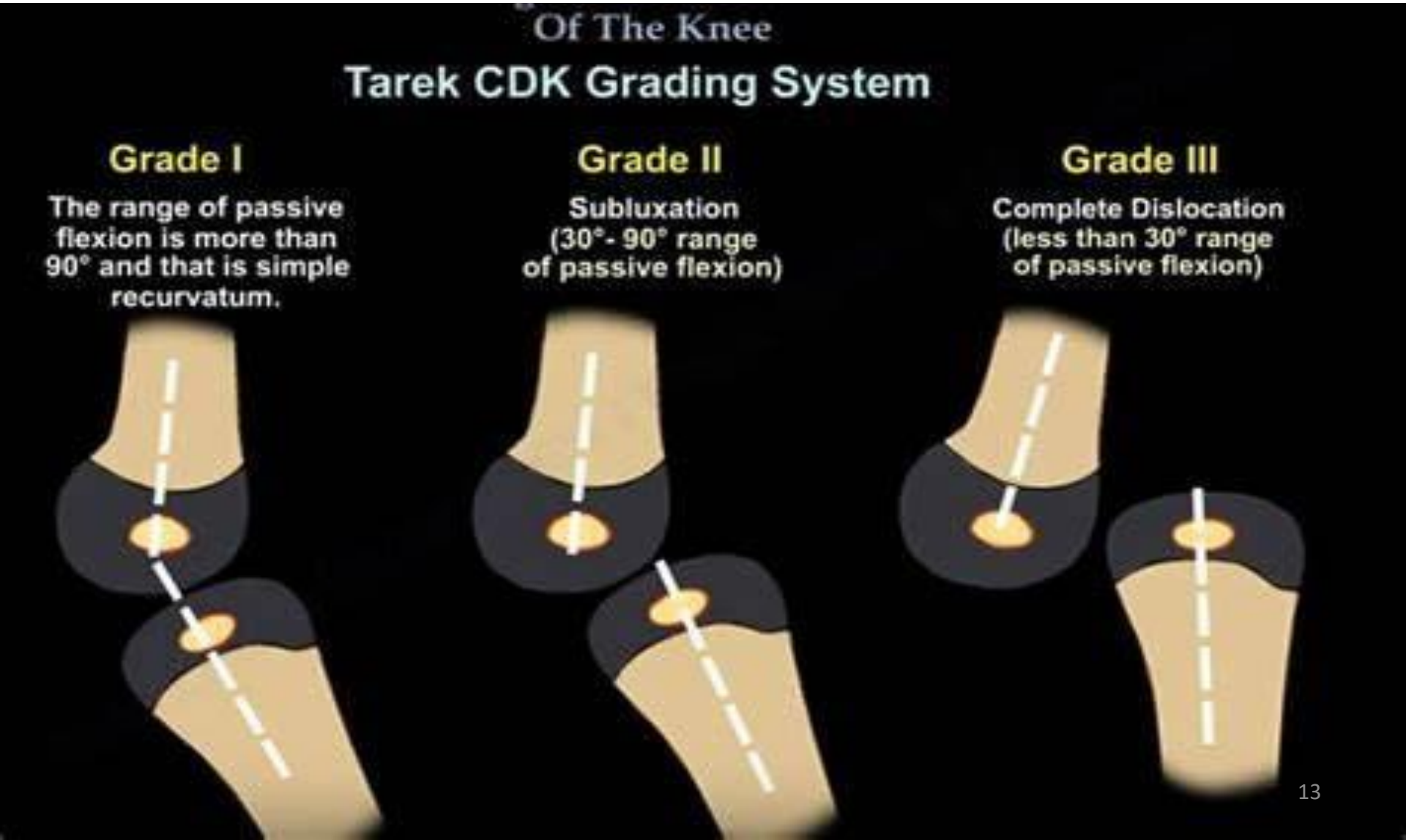
1.Leveulf Radiographic Classification System

Congenital Dislocation of the Knee

- Congenital Hyperextension
- Congenital Subluxation
- Congenital Dislocation



2. Tarek CDK Grading

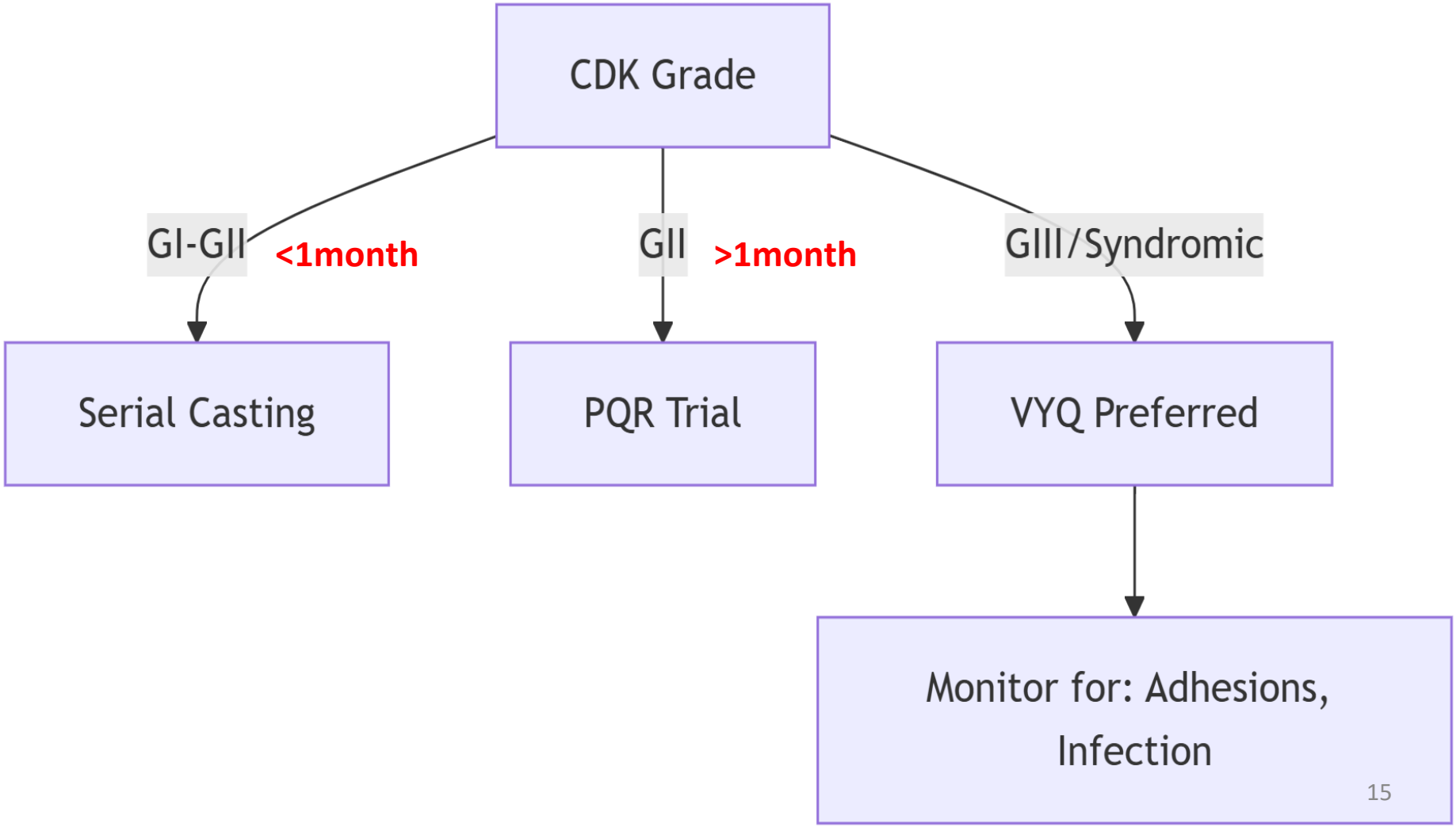


Management

- Untreated Congenital Knee Dislocation (CDK) leads to progressive:

- A Stiff, unstable knee
- Anterior tibial subluxation
- Quadriceps fibrosis
- Gait impairment

Management Algorithm



Management

Treatment Options Comparison

Method	Technique	Pros/Cons
Serial Casting	Gradual extension correction	• Non-invasive • Limited to GI-GII cases
Percutaneous Quadriceps Recession (PQR)	Mini-open tendon release	• Lower morbidity • Higher recurrence in GIII
V-Y Quadricepsplasty (VYQ)	Z-lengthening of quadriceps	• Better reduction maintenance • Higher complication risk

Conservative Treatment:

- Early manipulation and serial casting within first days of life.
- Splinting and bracing to maintain correction.

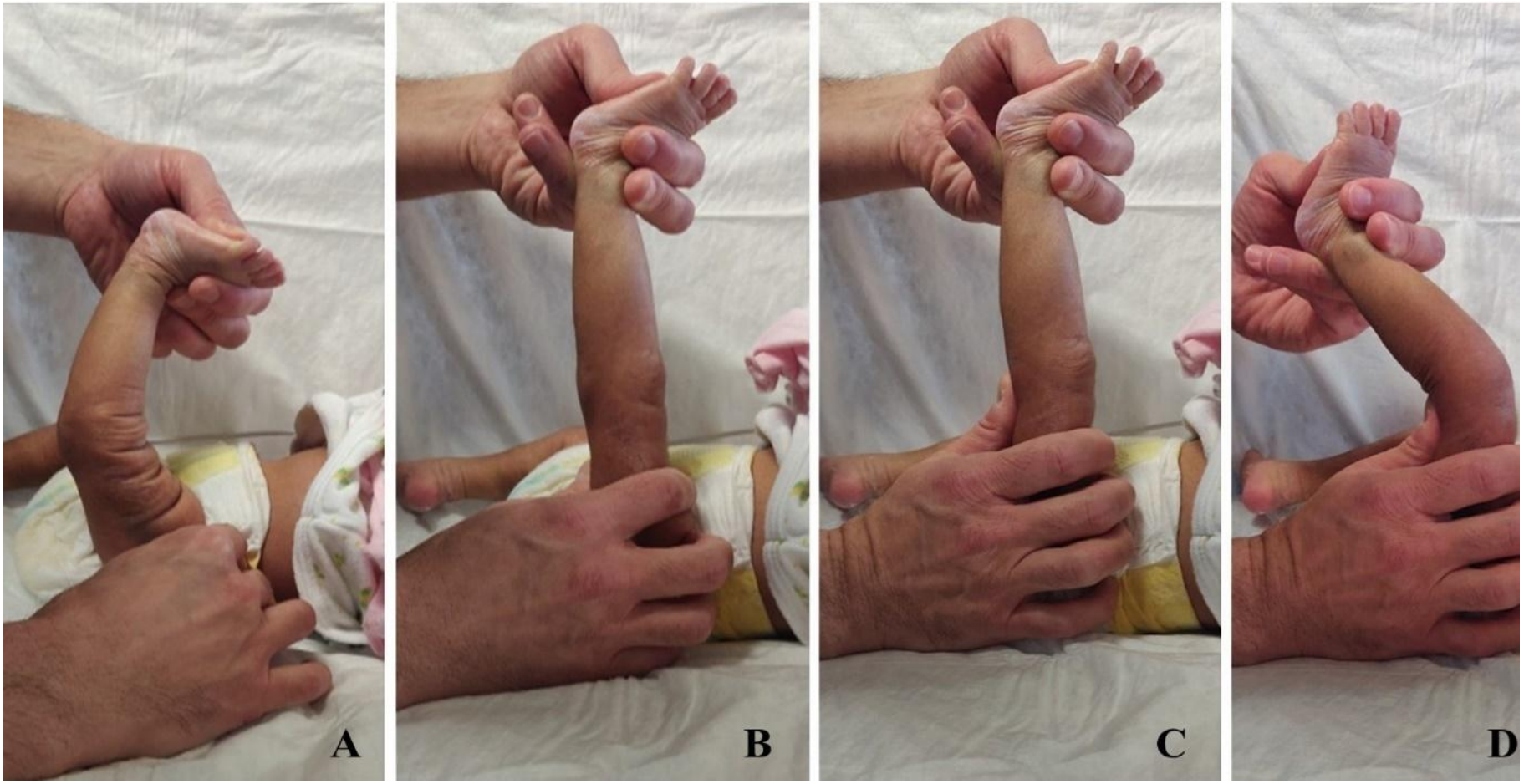


Fig. 2.The reduction maneuver: (A) starting position, (B) traction, (C) reduction with thumb placed on femoral condyles, (D) progressive flexion of the knee.

Double backslabs placed to keep knees reduced in slight flexion, immediately after delivery.

Double casts placed to keep knees reduced in 15-20° of flexion, at 12 hours of life

Double casts placed to keep knees reduced in 45° of flexion, at 4 days of life.

Double casts placed to keep knees reduced in 90° of flexion the right one and 70° of flexion the left one, at 7 days of life.

Results are 11 days of treatment. The knees are stable and maintain the reduction, the correction of the right knee is complete.

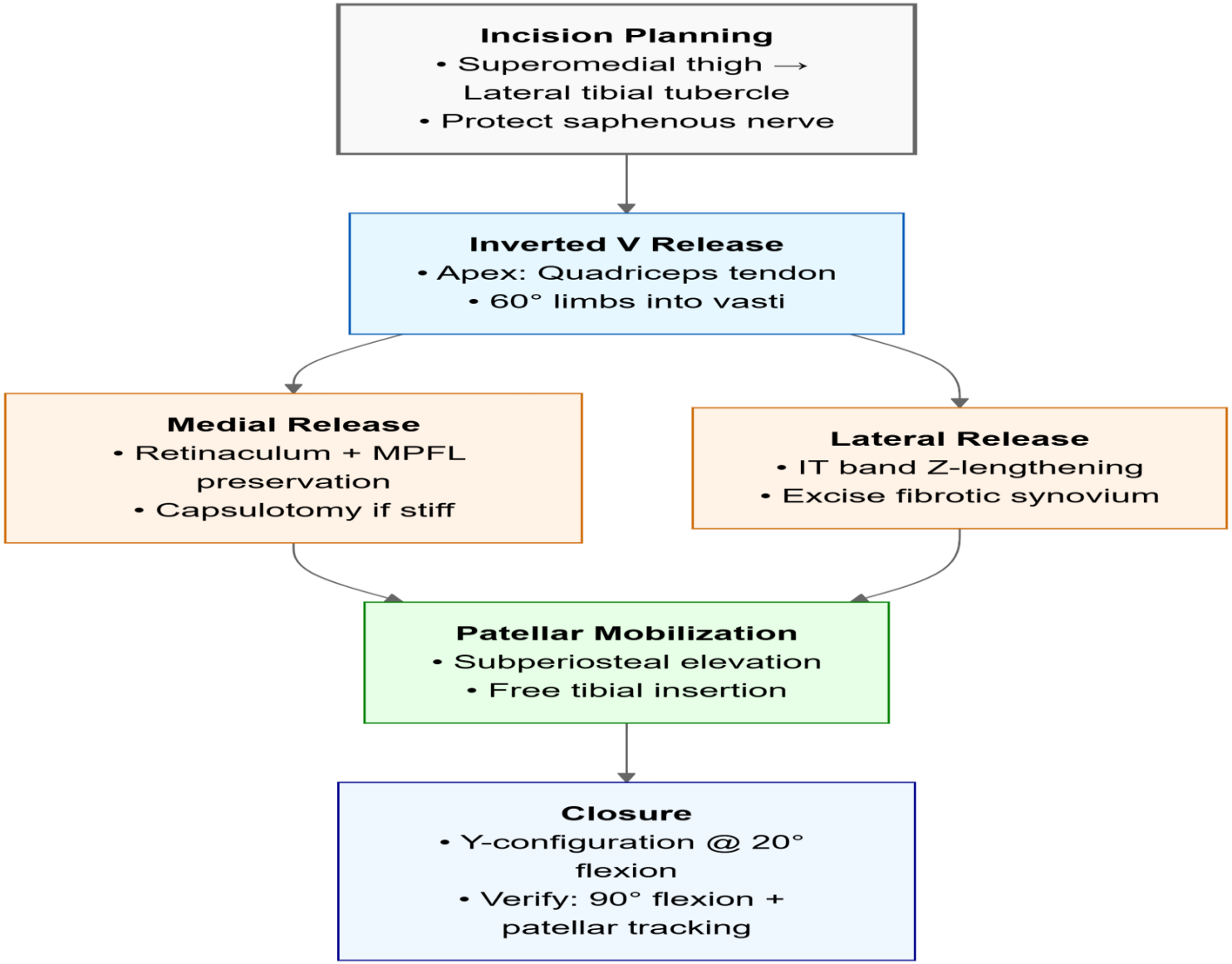
End of treatment at 21 days of life. Correction of both knees is complete, joints are stable and limbs are left free, without casts.

Follow-up at 2 months of life.

Outcomes of Non-Surgical Treatment in CDK

Author(s)	Study Details	Key Findings
Haga et al. [7]	Observational recommendation	Wait 1 month for spontaneous reduction in non-syndromic CDK (no clubfoot, AMC, or Larsen).
Johnson et al. [11]	17 patients, 11-year follow-up	7 of 9 non-surgical cases had good/fair results; early treatment and unilateral cases fared better. Arthrography not predictive.
Meyer [12]	68 patients	81% success if treated before 3 months; success drops to 33% if treated between 3–6 months.
Nogi & MacEwen [13]	17 patients (non-syndromic)	All but 3 treated successfully with manipulation + casting. Failures linked to delayed treatment and pseudo-reduction.
Ferris & Aichroth [6]	19 CDK patients; 9 non-surgical	5 of 9 had excellent/good results with early treatment (<3 months); poor outcomes in syndromic/delayed cases.

V-Y Quadricepsplasty

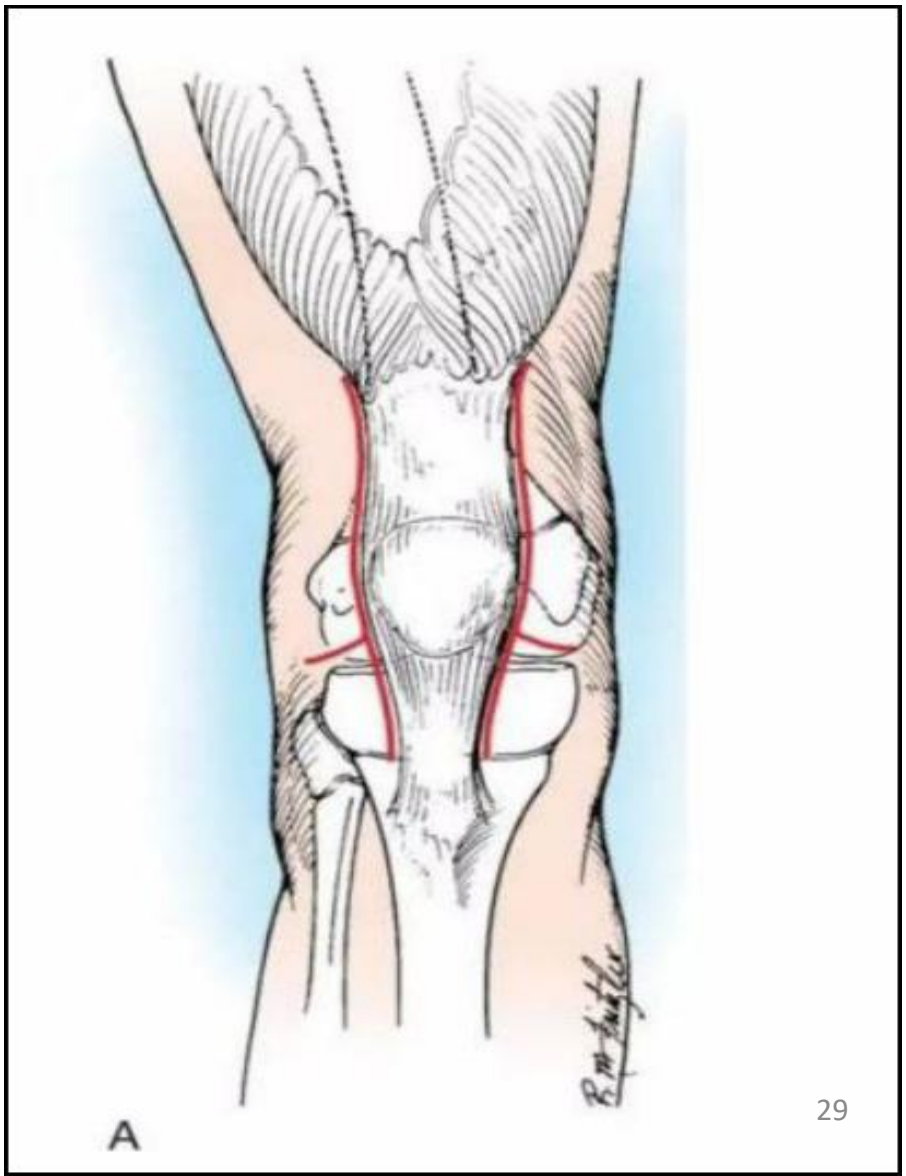


Surgical Treatment

- Indicated if fail to gain 30 degrees of flexion after 3 months of casting.
- Goal: to achieve 90 degrees of flexion.
- Procedures: quadricepsplasty, tendon transfers, femoral shortening osteotomy.

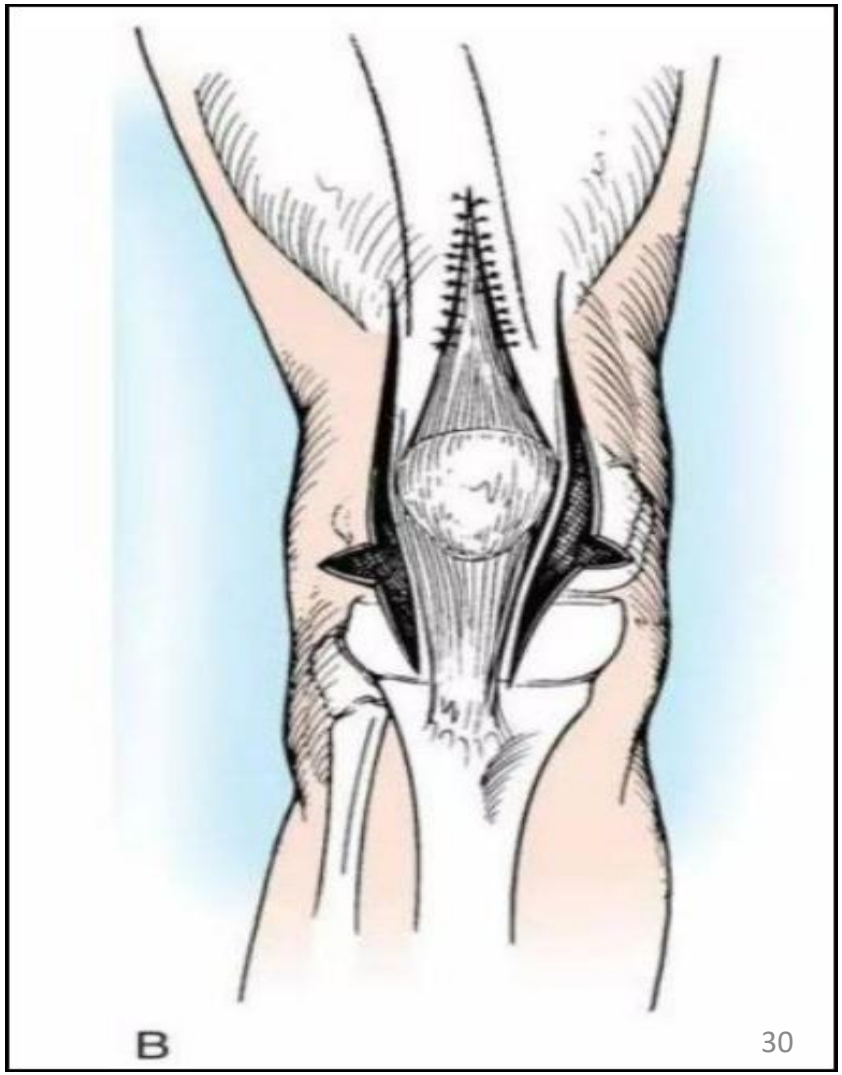
Curtis and Fisher technique

- Lines of incision to release anterior capsule medially and laterally.
- medial and lateral retinaculum of quadriceps mechanism.



Curtis and Fisher technique

- Correction after soft-tissue release and lengthening of rectus femoris muscle



Operative Treatment cont...

- **Postoperative:**
- Cast in 45 to 60 degrees of flexion for 3 to 4 weeks
- **In Rare Cases:**
- Osteotomy of the femur or tibia may be required in an older child.

VYQ vs PQR

- ***VYQ Morbidity Risks:***
- Intra-articular adhesions (↓ ROM)
- Wound breakdown (5-15% cases)
- Blood loss (↑ vs PQR by ~100mL)
- ***VYQ Advantages:***
- 94% success rate in GIII dislocations (vs 67% PQR)
- Durable reduction in syndromic cases (e.g., Larsen's)

Wound dehiscence

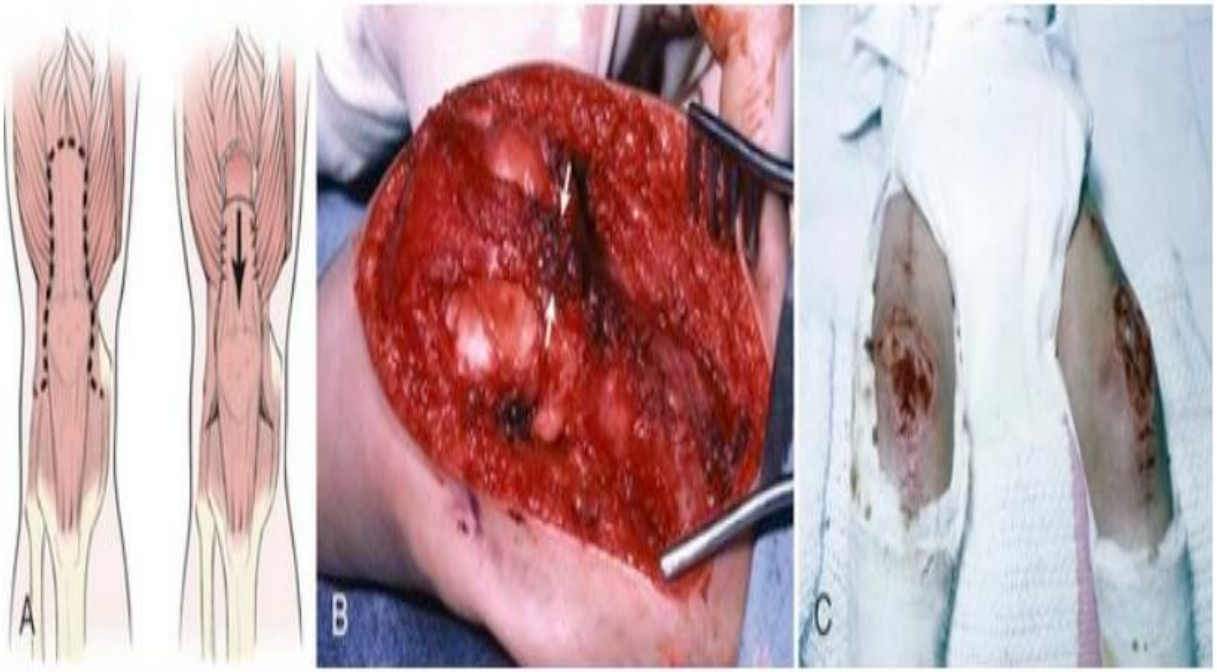
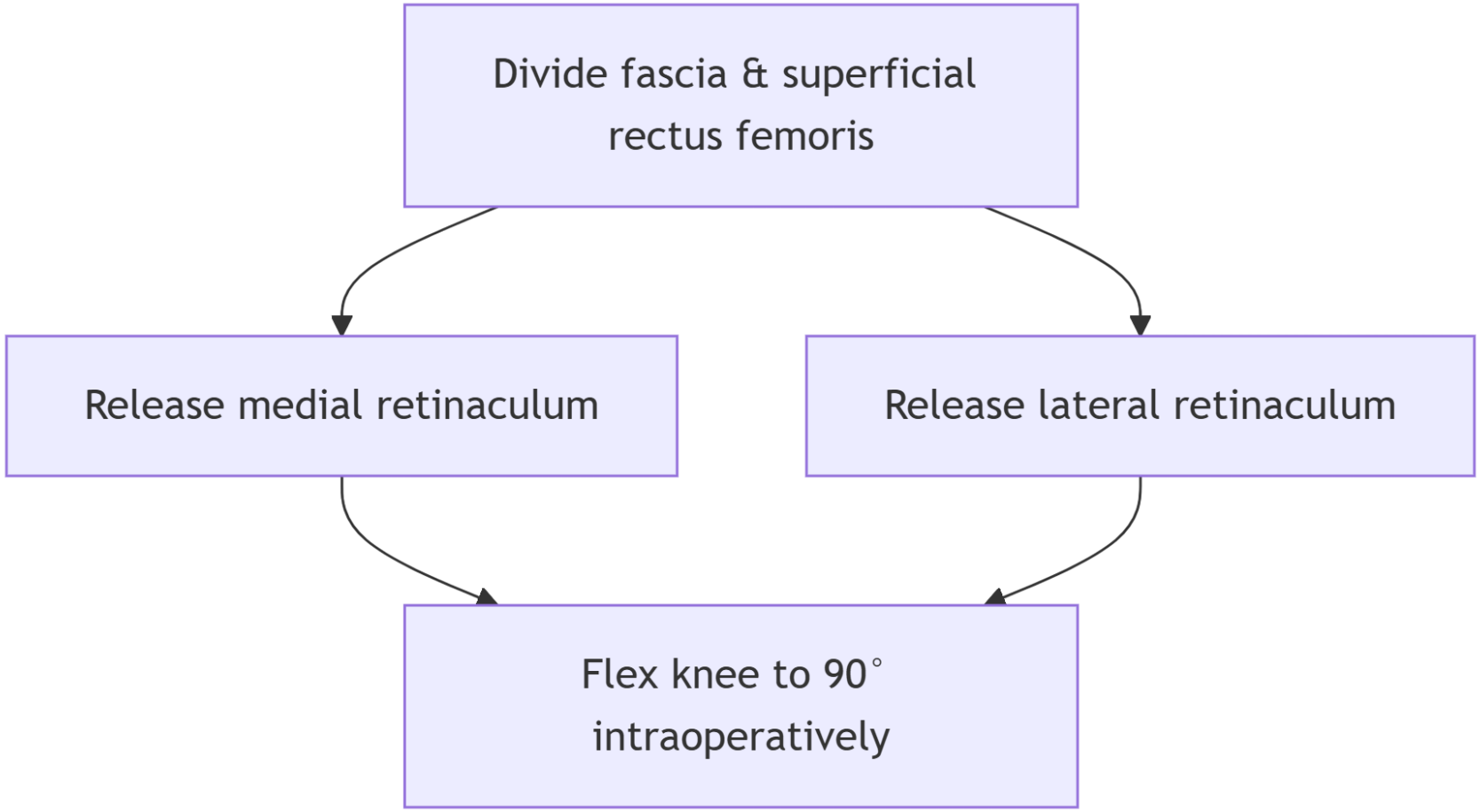
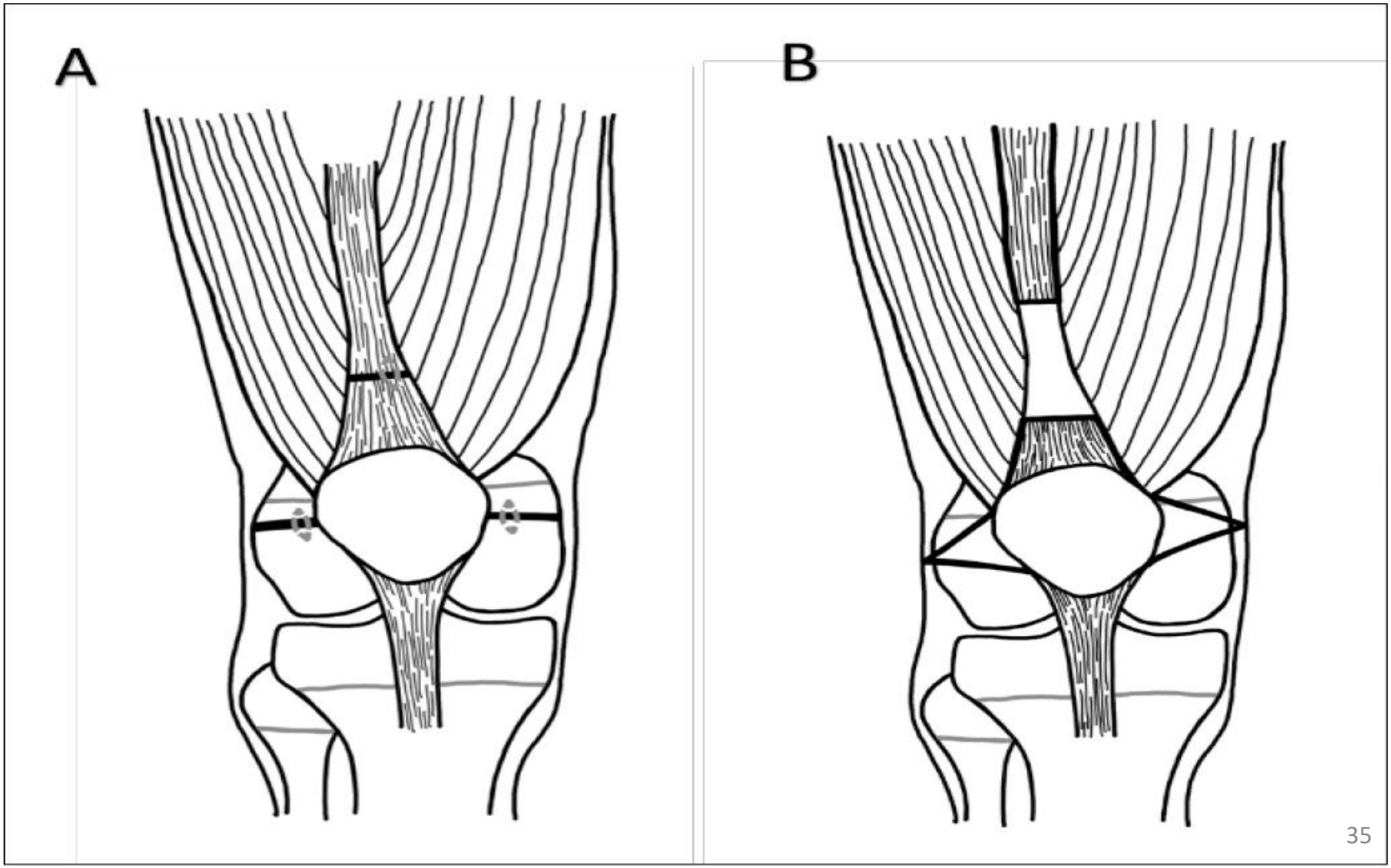


Figure 85-7 A, Classic V-Y quadricepsplasty. B, The resulting repair of the quadriceps tendon *(arrows)* is tenuous at best because of the extensive lengthening required to gain knee reduction (same patient as in Fig. 85-4). C, Wound dehiscence-slough as a result of skin necrosis from knee flexion.

Percutaneous Quadriceps Recession (Crawford, 1989)



PQR



Summary

- CKD is rare but treatable with early intervention.
- Classified into three types based on severity.
- Management includes conservative methods and surgery when needed.
- Prognosis depends on severity and timing of treatment.

Thank you