International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(3): 180-184

www.orthopaper.com
Received: 06-05-2019
Accepted: 10-06-2019

Dr. Hardik R Patel
Zydush Medical Collage and Hospital, Dahod, Gujarat, India

Correspondence
Dr. Hardik R Patel
Zydush Medical Collage and Hospital, Dahod, Gujarat, India

Study of patients treated for congenital dislocation of the knee with V-Y quadricepsplasty and capsulotomy and K wiring

Dr. Hardik R Patel

DOI: https://doi.org/10.22271/ortho.2019.v5.i3d.1528

Abstract
Background: Congenital dislocation of the knee is a rare congenital anomaly. We were fortunate to have significant number of this patients. This study was undertaken to evaluate the result of surgical management of congenital dislocation of the knee.
Method: In this study total 12 patients (19 knees) were included. We compare this study with BELL, Atkins & Sharrard series on the basis of age, sex, pattern of involvement, birth order, birth presentation, associate deformity and syndrome, range of movement. Our average follow up was 3 year and 8 months.
Result: In this study 15 knees (78.95%) had good result and 4 knees had fair result (21.05%). In our series all 12 patients had ability to walk among which 8 patients were community walker and 4 patients were household walker. In our study only 1 patient (1 knee) had wound gaping (5.26%).
Conclusion: Most of the patients presented at late stage requiring higher chances of surgery. If patients are referred at early age, there is possibility of treatment with plaster and decreasing need of surgery. Patients of idiopathic knee had good result then syndromic knee.

Keywords: congenital dislocation of the knee (CDK), Arthrogryposis multiplex congenital (AMC)

Introduction
Congenital dislocation of the knee is a rare congenital anomaly. It varies from simple hyperextension of the knee to complete dislocation of the tibia on the femur. Simple hyperextension is treated by cast and splint while complete dislocation is difficult to treat and requires complex surgery. Even after surgery knee does not become completely normal.
The exact etiology remains unknown. IT has been associated with certain factors including abnormal foetal position, Primary contracture of the quadriceps muscles, traumatic dislocation during parturition, Absence or hypoplasia of the cruciate ligaments, Lack of intrauterine space, Lack of amniotic fluid. Congenital dislocation of the knee is commonly associated with disorders like Arthrogryposis multiplex congenita, Larsen's syndrome, Down's syndrome etc. This study was undertaken to evaluate the result of surgical management of congenital dislocation of the knee.
Congenital dislocation of the knee is obvious deformity at the time of birth with hyperextension of the knee. Dimple or deep crease may be present over the anterior aspect of the knee. The patella is difficult to palpate. Congenital dislocation of the knee is usually associated with DDH (45%) and foot deformity (31%) [10]. Surgery is reserved for cases of failed conservative treatment or cases who present late, say after one year of age and options include VY Quadriceplasty, capsulotomy and k wiring. Bracing is used as adjunct to maintain reduction. We aim to review long term result after surgery at our institution.

Materials and Method
Our study was performed from April 2013 to April 2019 at the department of orthopaedics civil hospital and ZMCH Dahod. The average follow up period was 3yr and 8 month. There were 12 patients (19 knees) in which 8 male and 4 female patients. IN 8 patients 5 bilateral knee and 3 single. IN 4 female patients 2 bilateral and 2 single knee. 6 patients had AMC and 6 had idiopathic CDK.

Birth history, birth presentation, family history, types of previous treatement, associate anomaly and ROM of the knee included. X ray and photographs of all the patients were taken at the time of admission, during surgery and during follow up. These were used to classify the deformity and to see how much improvement in patients. We classify the CDK using Leveuf and pais (1947) [1] Classification. Describe congenital dislocation of the knee into three types.

In Grade I or congenital hyperextension of the knee: Knee flexion is easily possible and reduction is achieved with gentle stretching of the quadriceps. In Grade II or congenital subluxation of the knee: Knee flexion is not possible beyond neutral but the femoral and the tibial epiphyses are in contact and do not subluxate when flexion is attempted. In Grade III or true irreducible congenital dislocation of the knee: Knee flexion is not possible and the tibia which is anteriorly translated in the resting position may displace laterally on the femur when more vigorous flexion is attempted. in our study all 19 knees were dislocated.

These cases were operated by me and my assistant orthopaedic surgeon. Anaesthesia was decided by consultant anaesthetist. Preoperative antibiotics were given.

Curtish and Fisher (1969) [1] described a procedure for correction of congenital dislocation of the knee that is recommended for children of 6 to 8 months old.

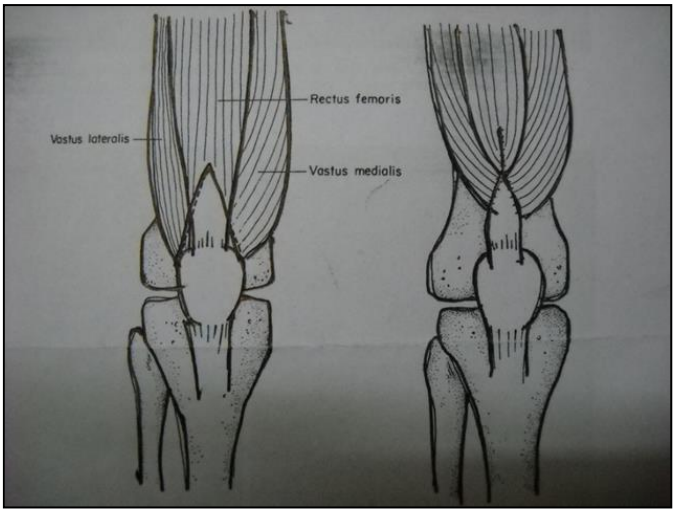
In our institute for congenital dislocation of knee, capsular release and V-Y quadricepsplasty and K-wiring is done.

Technique: Make a long midline anterior incision starting at the level of the middle third of the femur to the tibial tuberosity.

Expose the anterior thigh muscle and divide the quadriceps mechanism Superior to the patella by long inverted `V' Shaped incision. Adhesion between Vastus, patella and femur are removed. Lateral capsulotomy is done and Preserving hamstrings and popliteal tendon. Knee is flexed for inspection of the menisci and cruciate ligament.

In 60^0 flexion of the knee, K-wire is inserted from medial side of proximal tibia and pierces the lateral cortex of lower end femur.

Suture the lengthened quadriceps mechanism in 'Y' shape by repair of the vastus medialis to the lengthened rectus femoris. Close the wound after haemostasis then bend K-wire and apply long leg cast with the knee flexed up to 60^0.



(V-Y quadricepsplasty)

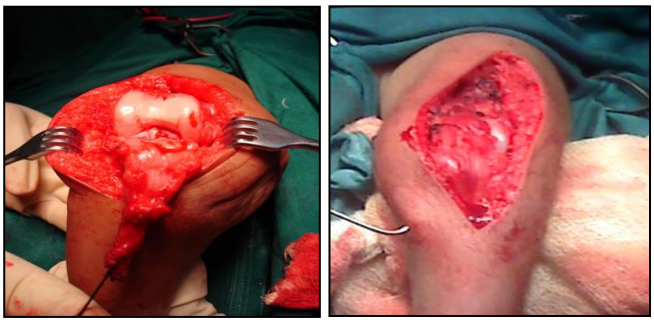


Fig 1: After the inverted V shaped incision of quadriceps mechanism, adhesion removed and lateral capsulotomy done, in 60^0 flexion of the knee k-wire inserted then suturing of the lengthened quadriceps mechanism in 'Y' shape by repair of the vastus medialis to the lengthened rectus femoris.

After 3 weeks, cast is changed and K-wire is removed and second cast is given with knee in 90^0flexion for 3 wks then AK-BK splint in 90^0flexion is given for 2-3 months after that night splint is given for 2-3 months and knee exercises are started.

Result

At final follow up, 15 knees (78.95%) had good result and 4 knees had fair results (21.05%). All 12 patients had ability to walk among wich 8 (66.67) patients were community walker and 4 patients (33.33%) were household walker. Only 1 patients had wound healing complication.

Functional outcome assessed by following criteria.

Criteria for result of congenital dislocation of the knee

	Good	Fair	Poor
Flexion	$>90^0$	46^0-90^0	0^0-45^0
Extension lag	$<5^0$	5^0-10^0	$>10^0$
Quadriceps power	$>4^0$	3^0-4^0	$<3^0$

Observation and Analysis

1. Sex distribution

Sex	Present Series		Bell, Atkins & Sharrard Series		P value
	No. of Patient	Percentage (%)	No. of Patient	Percentage (%)	
Male	08	66.67	04	80.00	0.50 (p>0.05)
Female	04	33.33	01	20.00	
Total	12	100.00	05	100.00	

In our series M: F ratio was 2:1 with male predominance. In Bell, Atkins & Sharrard Series M: F ratio was 4:1. Relation of CDK with age was not significant. (p>0.05)

2. Birth Presentation

Birth presentation	Present Series		Bell, Atkins & Sharrard Series		P value
	No. of patient	Percentage (%)	No. of patient	Percentage (%)	
Vertex	05	41.67	01	20.00	0.39(p>0.05)
Breech	07	58.33	04	80.00	
Total	12	100.00	05	100.00	

In our study 58% had breech presentation which compared to normal average of 3-4% which was significant.42% had vertex presentation. In BELL, ATKINS & SHARRARD series 80% had breech presentation and 20% had vertex presentation. This was statistically not significant. (p>0.05)

3. Type of Delivery

Type of delivery	No. of patient	Percentage (%)
Vaginal	05	41.67
Cesarean section	07	58.33
Total	12	100.00

In our series seven patients had breech presentation with C/S (58.33%) and 5 patients had vertex presentation with vaginal delivery (41.67%).

4. Previous Treatment

Previous treatment taken	No. of knee	Percentage (%)
Yes	08	42.10
No	11	57.90
Total	19	100.00

In our series 42% knee were treated previously at other hospital or institute in form of manipulation or plaster.

5. Age When Treatment Started

Age when treatment started by author	No. of Patient	Percentage (%)
0-1month	04	33.33
1-6month	05	41.67
6-12month	02	16.67
>1yr	01	8.33
Total	12	100.00

In our series treatment of 9 (75%) patients started within 6 month of life in which 33.33% in first month. Late presentation of patient had required higher chances of surgical treatment.

6. CDK – Idiopathic & Syndromic

CDK	No. of patient	Percentage (%)
Idiopathic	06	50.00
Syndromic	06	50.00
Total	12	100.00

In our series 50% of patients Of CDK were syndromic (associated with AMC). 50% 0f patients of CDK were idiopathic

7. Associated Deformity (DDH & CTEV) In AMC & Non AMC

CDK associated with	DDH		CTEV	
	No. of patient	Percentage (%)	No. of patient	Percentage (%)
AMC	04	80.00	05	100.00
NON AMC	01	20.00	00	00.00
Total	05	100.00	05	100.00

In our study 4 patients with AMC had DDH and 1 patient not associated with AMC had DDH. 5 patients with AMC had CTEV.

8) Type of Dislocation

Type	No. of knee	Percentage (%)
Subluxation	--	--
Recurvatum	--	--
Dislocation	19	100.00

In our study all 19 knee (12 patients) had ant. dislocation and required surgery.

9. Complication

Complication	Present Series		Bell, Atkins & Sharrard Series		P value
	No. of knee	Percentage (%)	No. of knee	Percentage (%)	
Wound infection	00	00.00	00	00.00	0.52 (p>0.05)
Wound gaping	01	5.26	02	22.22	
Others	00	00.00	00	00.00	

In our study only 1 knee (case no. 10) had wound gaping. In follow up patient had good result. In BELL, ATKINS & Sharrard series 2 knees (22.22%) had wound gaping. This was statistically not significant. (p>0.05)

10) R.O.M
Flexion

Flexion	Present Series		Bell, Atkins & Sharrard Series		P value
	No. of knee	Percentage (%)	No. of patient	Percentage (%)	
0^0-45^0	02	10.52	01	11.11	0.79 (p>0.05)
46^0-90^0	11	52.63	03	33.33	
>90^0	07	36.85	05	55.56	
Total	19	100.00	09	100.00	

In our study flexion was in between 0^0-120^0. Average flexion was 85^0. In study of BELL, ATKINS & SHARRARD flexion was ranging from 0^0-150^0 and average flexion was 95^0. When compared, this was statistically not significant. (p>0.05)

Extension Lag

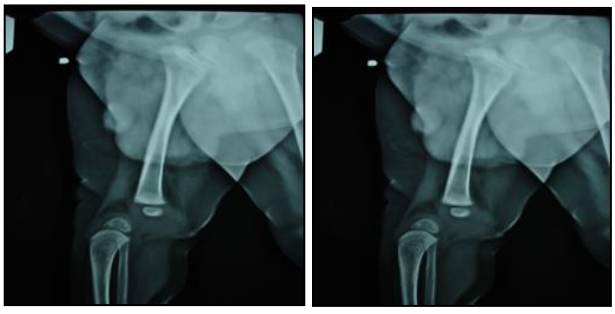
Extension lag	Present Series		Bell, Atkins & Sharrard Series		P value
	No. of knee	Percentage (%)	No. of knee	Percentage (%)	
<5^0	10	52.63	02	22.22	0.68 (p>0.05)
5^0-10^0	09	47.37	03	33.33	
>10^0	00	00.00	04	44.45	
Total	19	100.00	09	100.00	

In our series extension lag was in between 0^0-15^0 and average extension lag was 3^0. In study of BELL, ATKINS & Sharrard extension lag was in between 0^0- $30^0$and average extension lag was 14^0.

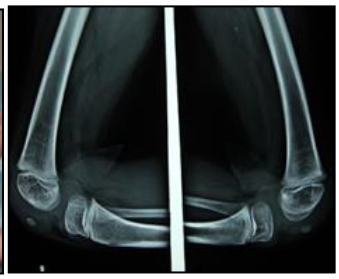
11. Quadriceps Power

Quadriceps Power	No. of knee	Percentage (%)
5	14	73.68
4	05	26.32
≤3	00	00.00

In our study quadriceps power of all knees were 4 to 5 (100%) similar to study of Bell, Atkins & Sharrard.



(Pre-operative)

(Pre-operative) **(Final follow up)**


(Final follow up)

Discussion

We studied the results of operative treatment of CDK in 12 patients (19knees). In our study bilateral dislocation was more common than unilateral with bilateral to unilateral ratio was 1.4:1, left side dislocation was more common than right with left to right ratio was 4:1. Male patients were more common than female, with M:F ratio was 2:1. Sex ratio in CDK was statistically non-significant. In our study 58% had breech presentation, which compared to normal average of 3-4% is statistically significant with P value=0.02 ($p<0.05$). In Bell, Atkins and Sharrard series 80% had breech presentation; this suggests that breech presentation is probably a contributing factor in CDK. In our study family history of CDK was positive in one patient (Sr.no.10). Relation of CDK with family history was statistically not significant. In our study 5 patients (41.67%) had second birth order. Relation of CDK with birth order was statistically not significant. In our study 6 patients were associated with AMC (50%) and 6 had idiopathic CDK (50%). Five patients (41.67%) had DDH among which 4 patients had AMC. In our series 5 (41.67%) patients had CTEV and all these patients were arthrogrypotic. In our series only 1 patient (5.26%) had wound gaping. Wound gaping is one of the most common complication associated with quadricepsplasty [6]. In Bell, Atkins & Sharrard series 22.22% of patients had wound gaping. Our average follow up was 3 year and 8 months. Currently all our patients are under regular follow up. We plan to publish long term follow up study in future. On follow up all 12 patients had ability to walk, among which 8 patients (66.67%) were community walker and 4 patients (33.33%) were household walker. Seven patients (58.33%) had ability to cross leg sitting. Quadriceps powers of all (19) knees were $\geq$4. Extension lag was seen in 7 patients (58.33%). Extension lag was observed in patients who were operated at older age and patients who did not do regular physiotherapy. In our series 15 knees (78.95%) had good results and 4 knees (21.05%) had fair results. All 6 patients (100.00%) with idiopathic CDK had good result. Of 6 patients of AMC, 2 patients (33.33%) had good result and 4 patients (66.67%) had fair result. This was due to underlying pathology and associated other limb deformities. This is reported repeatedly in literature [6, 14].

Conclusion

Congenital dislocation of the knee is a rare congenital anomaly. We were fortunate to have significant number of patients with this rare anomaly. In our series 50% of patients (6) were arthrogrypotic. Higher incidence of breech presentation with P value=0.02($p<0.05$), suggest that breech presentation is probably a contributing factor for congenital dislocation of the knee.

Most of the patients presented at later age requiring higher chances of surgery. If patients are referred at early age, there is possibility of treatment with plaster and decreasing need of surgery.

DDH (41.67%) and CTEV (41.67%) were more common in arthrogrypotic patients than idiopathic. Rate of wound complication was low (5.26%) in our series, this was due to meticulous surgical technique.

All our patients had ability to walk. Patients of idiopathic CDK had good range of movement but arthrogrypotic patients had restricted movement. All Patients of idiopathic CDK had good result. All fair result seen in arthrogrypotic patients due to multiple associate deformities and underlying pathology.

References

1. Burr Curtish H, Robert Fisher L. Congenital hyperextension with ant. Subluxation of the knee, surgical treatment and long term observation. JBJS. 1969; 51:255-269.
2. Katz MP, Grogono BJS, Soper KC. The aetiology and treatment of congenital dislocation of the knee. JBJS, 1967, 49B.
3. Toshihde Ooishi, Yoichi Sugioka, Shinsuke Matsumoto, Toshi Fujii. Congenital Dislocation of the knee, its pathologic features and treatment. Clinical orthop and related research, 1993.
4. Nirav Shah R, Matthew Dobbs B. A minimally invasive treatment protocol for the congenital Dislocation of the knee. Paediatric Orthopaedic, 2009, 29.
5. Matthew Dobbs B, Stephanie Boehm, Dorothy Grange K, Christina Gurnett A. Studied congenital dislocation in a Patient with Larsen syndrome and a Novel Filamin B mutation. Clinical orthop and related research, 466, 2008.
6. Bell MJ, Atkins RM, Sharrard WJW. Irreducible Congenital dislocation of the knee, aetiology and management. JBJS. 1987; 69(B).
7. Niebaur JJ, King DE. Congenital dislocation of the knee. JBJS (Am.). 1960; 42:207-225.
8. John Anthony Herring: Congenital hyperextension of the knee. Tachdjian's paediatric orthopaedic, 2:919-924.
9. Campbell's operative orthopaedics: Congenital hyperextension of the knee. 2, 11th Edition, 113-115.
10. David Carlson H, John O'Connor. Case report on congenital dislocation of the knee, Am J Roentgenol. 1967; 127:465-468.
11. Ahmadi B, Shahriaree H. CM Silver: Severe Congenital genu recurvatum, case report. JBJS. 1979; 61:622-623.
12. Bose K, Chong KC. The clinical manifestation and pathomechanics of contracture of the extensor mechanism of the knee. JBJS. 1976; 58B:478-484.
13. Austwick DH, Dondy DJ. Early operation for congenital Subluxation of the knee. J Paeditric orthop. 1983; 3:85-7.
14. Ferris B, Aichroth P. The treatment of congenital knee dislocation; A review of the nineteen knees. Clinical Orthop. 1987; 216:135.
15. Roy DR, Crawford AH. Percutaneous quadriceps recession technique for management of congenital

hyperextension deformities of the knee in neonate. J Paediatric orthop. 1989, 717-719.
16. Haga N, Nakamura S, Sakaguchi R *et al*. Congenital dislocation of the knee reduced spontaneously or with minimal treatment. J Paediatric orthop. 1997; 17:59-62.
17. Weiss SM, Brooks DB. A Simplified method of splinting for congenital dislocation of the knee, Clin Orthop and related Res. 1977; 216:40-41.
18. Curtis BH, Fisher R. Heritable Congenital tibiofemoral subluxation. Clinical features and surgical treatment. JBJS. 1970; 52A:1104-1114.
19. Eric Johnson, Robert Audell, Willian Oppenheim L. Congenital Dislocation of the knee. J Pediatr Orthop. 1987; 7:194-200.
20. Mohammod Arshad Ikram, Ali Saleh Abdullah, Eman Al Khalfan. Congenital genu recurvatum with dislocation of the knees: A case report. Kuwait Medical Journal. 2004; 36(3):203-205.
21. Sijmons Van Essen, Visser Iprenburg, Nelck Vos-Bender, De Jong. Congenital knee dislocation in a 49 XXXXY boy. J Med Genet. 1995; 32:309-311.