Judet's extensive quadriceps release and "à la carte" combined procedures for the management of **patellar dislocation in flexion**

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All authors declare that they have no conflicts of interest.

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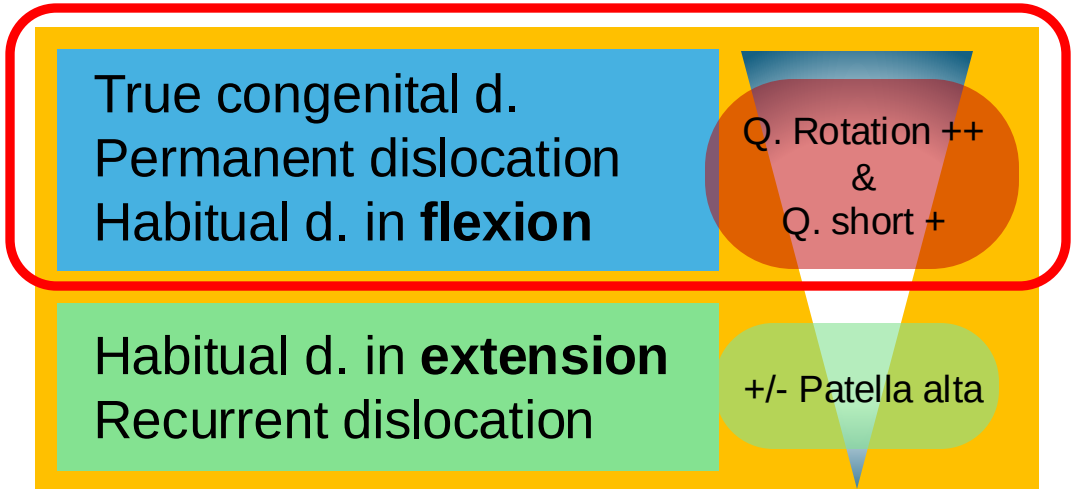
Chotel's Classification: Patellofemoral Instability (Children and Adolescents)



True congenital patellar dislocation

→ Flexum & valgus at birth.

→ Quadriceps acts as a knee flexor!

Permanent patellar dislocation

→ Present at birth, short quadriceps, diagnosed before age 5.

Habitual patellar dislocation in flexion

→ Symptom onset between ages 5 and 8.

Chotel F, Bérard J, Raux S. *Patellar instability in children and adolescents. Orthop Traumatol Surg Res 2014;100(1):S125–S137*

Chotel's Classification: Patellofemoral Instability (Children and Adolescents)

True congenital patellar dislocation

→ **Flexum & valgus** at birth

→ Quadriceps so short and turned outwards that it becomes a knee flexor

True congenital d.
Permanent dislocation
Habitual d. in flexion

Q. Rotation ++
&
Q. short +

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Chotel's Classification: Patellofemoral Instability (Children and Adolescents)

Permanent patellar dislocation

→ Present at birth / short quadriceps / diagnosis after beginning to walk before the age of 5

→ **No flexum** at birth

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Chotel's Classification: Patellofemoral Instability (Children and Adolescents)

Habitual patellar dislocation in flexion

→ Onset of symptoms between 5 and 8 weeks

→ **No flexum** at birth

True congenital d.
Permanent dislocation
Habitual d. in flexion

Q. Rotation ++
&
Q. short +

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Associated Syndromes:

Table 1. Demographic data: Distribution of age, sex and underlying syndromes/idiopathic patients according to TCPD, PPD, and HPDF

		TCPD	PPD	HPDF	P value
Total No. of knees included		7	8	22	-
Age, mean (min-max)	At time of first diagnosis	0.0	7.4 (3.0-12.0)	9.0 (1.5-12.5)	p<0.001*
	At time of surgery	2.5 (1.0-4.5)	12.2 (9.3-15.7)	11.7 (4.3-16.4)	p<0.001*
Sex	Male/female ratio	3/4	4/4	6/16	p=0.48
Side	Left/right	4/3	4/4	12/10	p=0.96
Underlying syndrome/ idiopathic (% of the group)	Scott Taor syndrome			6 (27%)	-
	Nail patella syndrome	2 (29%)	1 (13%)	1 (5%)	-
	Down syndrome		1 (13%)	1 (5%)	-
	Larsen syndrome	2 (29%)			-
	Mabry syndrome		1 (13%)	1 (5%)	-
	3M syndrome			1 (5%)	-
	Autism spectrum disorder and Giant congenital melanocytic nevi			1 (5%)	-
	Carey-Fineman-Ziter syndrome	1 (14%)			-
	Cerebral palsy			1 (5%)	-
	Cohen syndrome		1 (13%)		-
	DiGeorge syndrome	1 (14%)			-
	Rubinstein-Taybi syndrome		1 (13%)		-
	Unknown syndrome	1 (14%)			-
	Idiopathic		3 (38%)	10 (46%)	-

*HPDF = habitual patellar dislocation in flexion, No. = number, min-max = minimum value – maximum value, PPD = permanent patellar dislocation, TCPD = true congenital patellar dislocation, % = percentage all numbers are rounded to one decimal place, * = statistically significant*

Scott-Taor-Syndrome (Small-Patella-Syndrome)

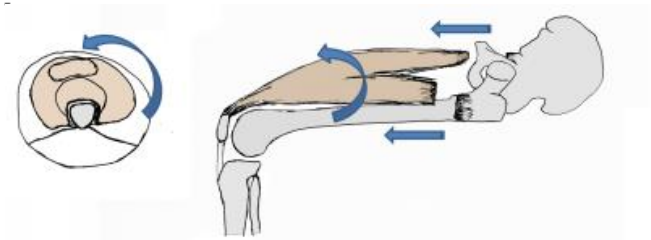
Nail Patella Syndrome

Larson-Syndrome

Down-Syndrome

Surgical Treatment

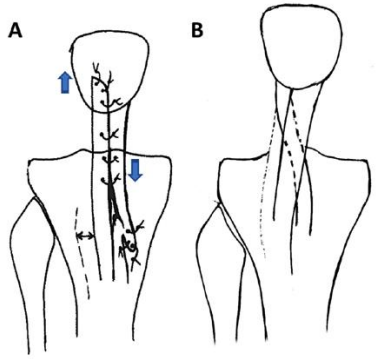
Shortened and externally rotated quadriceps ➔ Quadricepsplasty according to Judet (n = 36)



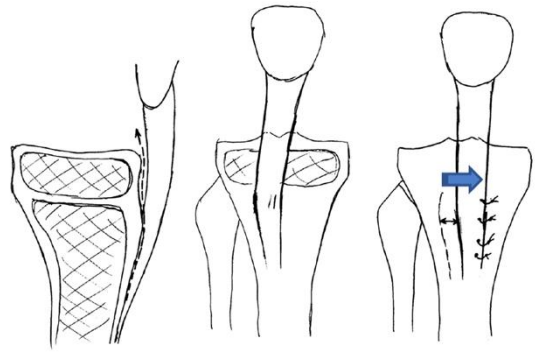
Patellar tracking and stability ➔ Additional "à la carte" combined procedures:

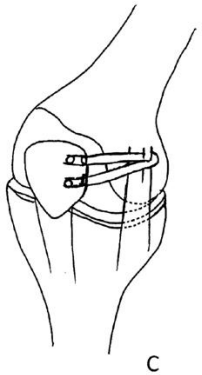
- MPFL reconstruction (n = 25)
- Trochleoplasty (n = 10)
- Distal realignment at the tibial tuberosity:
  - Soft tissue procedures (n = 27)
  - Bone procedures (n = 5)

- Femoral osteotomy for shortening and derotation to avoid femoral nerve overstretching
  (n = 4, True congenital patellar dislocation)

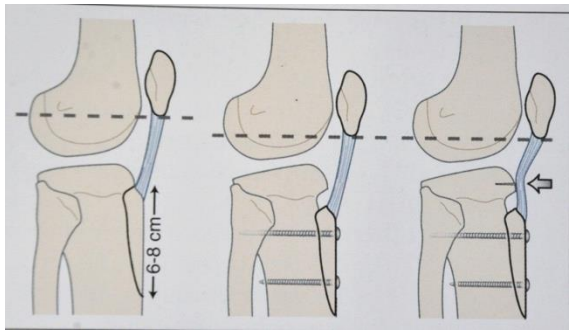


Roux-Goldthwait


"Baguette molle" (Grammont)



MPFL reconstruction



"Bony“ Medialization
+/- lowering of the tibial tuberosity

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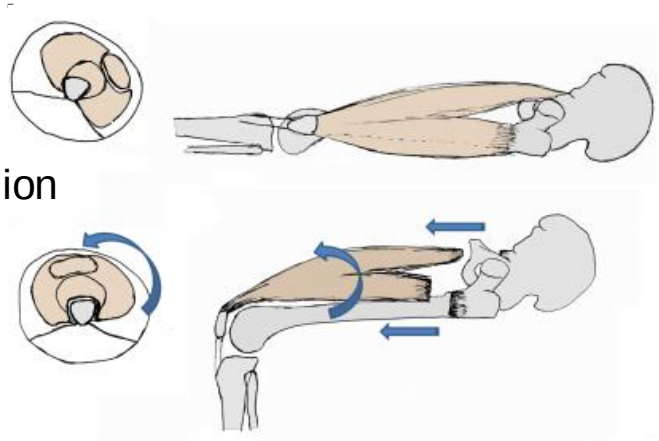
Judet's extensive quadriceps release

Surgical Technique:

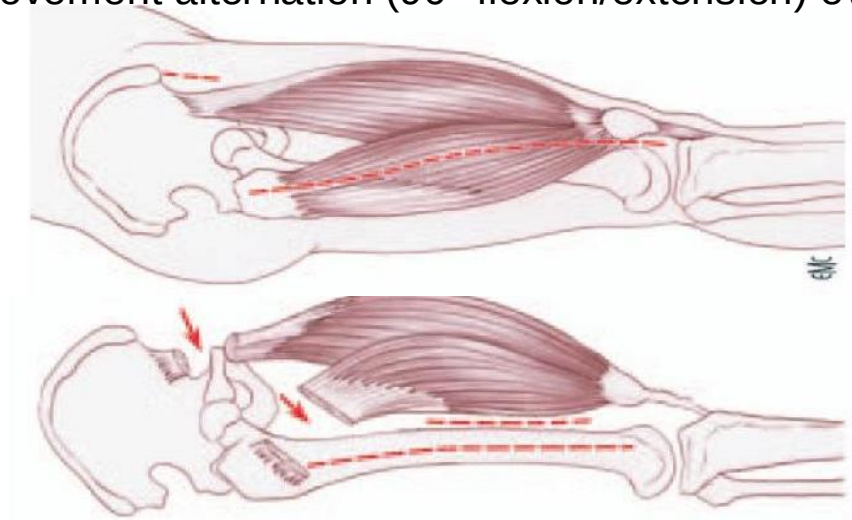
- **Lateral approach**
- **Extraperiosteal release** of all quadriceps muscle insertions at the femur and pelvis:
  - **Vastus lateralis:** Detached from the intermuscular septum and femur + trochanteric region
  - **Rectus femoris:** Tenotomy at the anterior inferior iliac spine (*separate approach*)



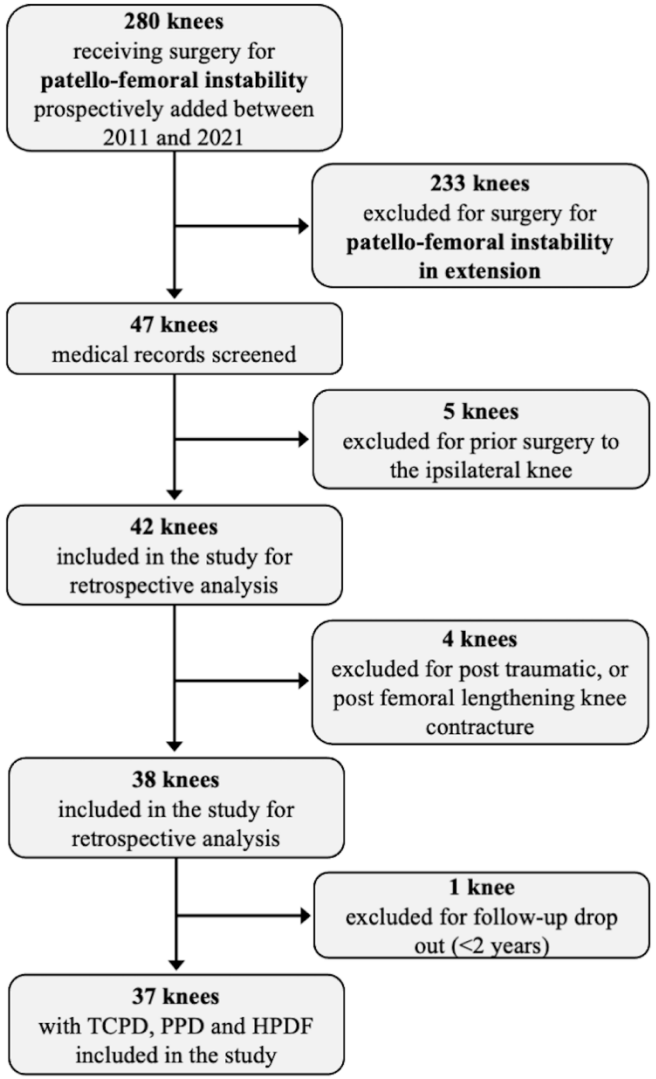
Goal: Complete knee flexion with patella in position (*"thumb test"*)

Postoperative Care:

- Epidural anesthesia
- Splint for 6 weeks with movement alternation (90° flexion/extension) every 4-6 hours
- No sports for 6 months



Inclusion and Exclusion Criteria



- 37 knees (31 patients)

Inclusion criteria:

- Surgical treatment of **patellofemoral instability <u>in flexion</u>**

Exclusion criteria:

- **Prior knee surgery,**
- post-traumatic **quadriceps contractures**, post-lengthening **quadriceps contractures**,
- postoperative **follow-up <2 years**

Complications, recurrences and clinical results

Postoperative Follow-Up (Average: 6.5 years)

Complications: (4 knees, 10.8%), 3 knees required reoperation

Recurrent dislocation: (n = 3; 8.1%)

- **In flexion** due to incomplete quadriceps release (n = 2)
- **In extension** due to lack of additional "à la carte" procedures (n = 1)

Kujala and Simple-knee-score: 92,7% and 87,3%

→ **No complications or recurrent dislocation in children <7 years**

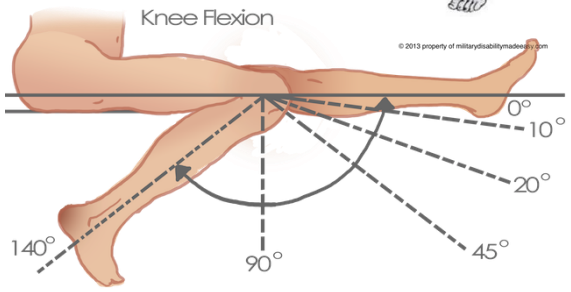
Quadriceps Strength Post-Surgery:

- Good postoperative quadriceps strength: 4.97 (±0.16) on Daniel scale (0-5)

Knee joint range of motion:

Good active and passive knee mobility

- Post-op active extension deficit: 1.8° (±4.9)
- Max passive flexion post-op: 144.7° (±8.4)



- Only 2 knees had an active extension deficit >10°
- No knee had a max passive flexion <120°

Summary

Quadricepsplasty according to Judet + "à la carte" combined procedures:

- Good function and knee mobility
- Strong quadriceps strength
- Low complication and recurrence rates

Recurrent dislocation in flexion: → Due to inadequate quadriceps release

Recurrent dislocation in extension:
→ Due to insufficient additional "à la carte" procedures

Age < 7 years:
- Fewer additional "à la carte" procedures required
- Lower recurrence rate
- Lower complication rate

Thank you very much
for your attention
and
a big thank you to
my colleagues in Lyon!

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References:

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