



A systematic review on management and outcome of irreducible knee dislocations (IKD).

Shahbaz S Malik , Jess K Osan, Randeep S Aujla, Nadim Aslam,
Peter D'Alessandro, Peter B MacDonald

Disclosures

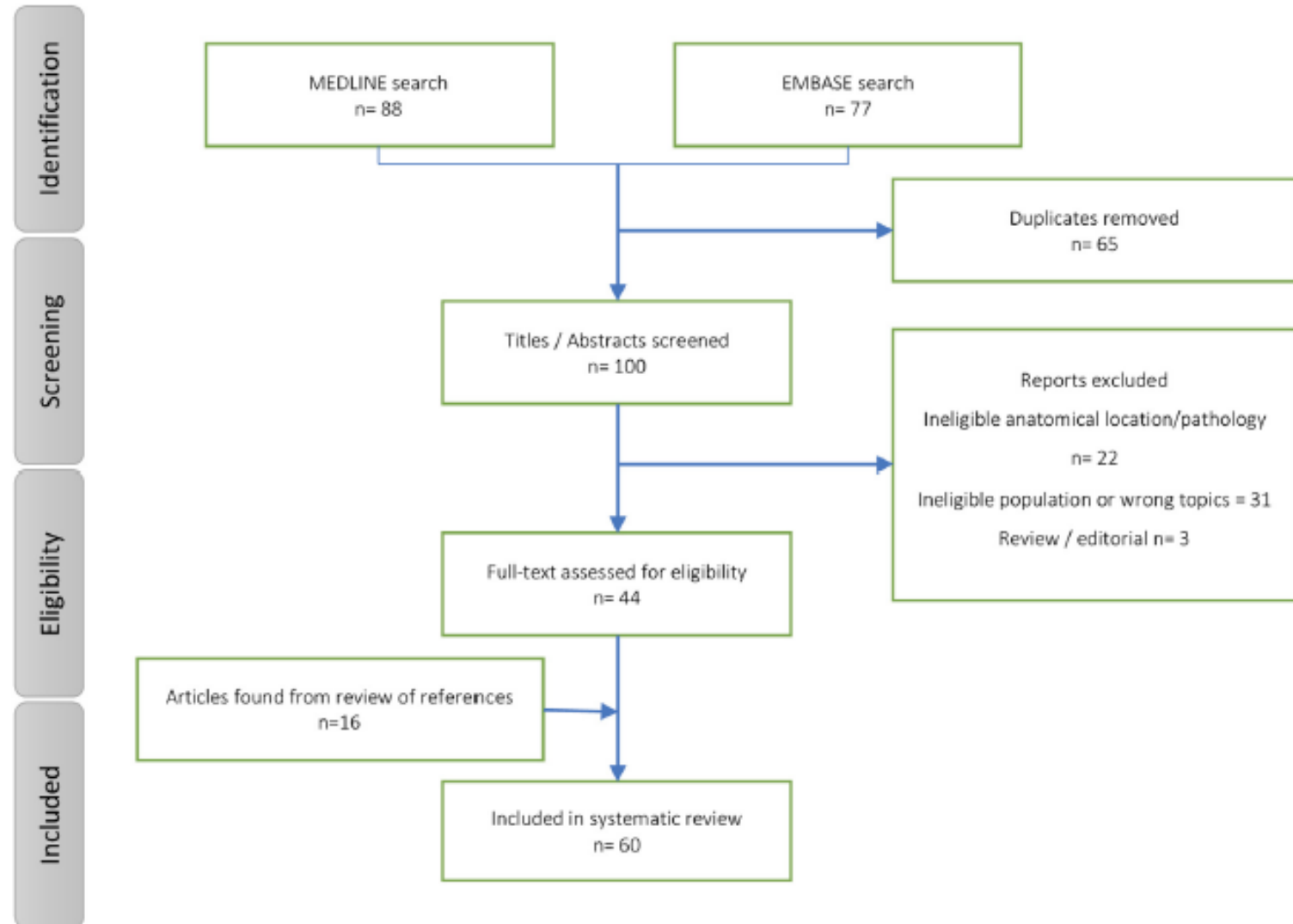
- No financial conflicts to disclose for any of the authors.

Background

- Irreducible knee dislocations (IKD) are rare and can often be missed or misdiagnosed.
- The incidence of knee dislocation = 0.01% and 0.2% of all orthopaedic injuries
 - 4% of these dislocations sub-classified as irreducible.
- **Primary aim** → to analyse cases of IKD described in the literature.
- **Secondary aim** → To produce a streamlined approach for managing these patients.

Methods

- PRISMA guidelines
- Sep & Oct 2021
- Eligibility
 - Primary + clinical
 - Including case series or case reports
 - Reporting on IKD
- MINORS tool + CONSORT checklist



Results

- 60 studies were eligible for inclusion.
- 114 cases of IKD.
- 85% were Posterolateral (PL) dislocation.
- 70% had a dimple sign present.

Results

- 100% of cases required surgery
 - Open reduction in 73.7%
 - Arthroscopy only in 14.9%
- Ligament surgery performed in 71% cases
 - MCL repair in 32.3%
 - MCL, ACL, PCL ± other structures in 27.6%
- Meniscal injury in 17.6%
- Vascular injury in 3.6%
- Nerve injury in 5.4%

Results

Dislocation type	
n = 114	
PL	79 (85%)
Lateral	9 (9.7%)
Posterior	4 (4.3%)
AM	1 (1.1%)
Total	93
Not reported	21

Dimple sign	
n = 114	
Yes	60 (70%)
No	26 (30%)
Total	86
Not reported	28

Summary of injury characteristics

Injury characteristics	Number of cases
Mechanism of injury	
n = 114	
Fall	49 (44.5%)
Fall	14
Skiing	8
Twist	7
Sports tackle	6
Hole	6
Height	3
Horse	1
Slip	2
Snowboarding	1
Bicycle	1
RTA	36 (32.7%)
Motorcycle	13 (11.8%)
Work related	3 (2.7%)
Rotor tiller	4 (3.6%)
Rolling down the hill	2 (1.8%)
Trapped	1 (0.9%)
Paragliding	1 (0.9%)
Hit by box	1 (0.9%)
Total	110
Not reported	4

Blocks to reduction	
n = 114	
MCL ± medial structures ^a	54 (52.4%)
Medial retinaculum and/or capsule	31 (30.1%)
Vastus medialis	7 (6.8%)
Patella	5 (4.9%)
Accessory gastrocnemius head	1
Extensor retinaculum	1
Medial menisci	1
Patella tendon	1
Posterolateral capsuloligamentary structures	1
Multiple structures ^b	1
Total	103
Not reported	11

Structures injured	Number of cases
Ligaments	
Intact ligaments	1
MCL only	3 (2.7%)
ACL, MCL	4 (3.6%)
ACL, PCL, MCL ± other structures	88 (80%)
ACL, PCL, MCL	76
+ Vastus medialis	3
+ Adductor longus	1
+ MPFL	1
+ MPFL, PMC	1
+ Pes Anserinus, medial gastrocnemius	1
+ PMC	1
+ Popliteus, adductor magnus	2
+ Quadriceps tendon	1
+ Semimembranosus tendon	1
ACL, PCL, MCL, LCL ± other structures	11 (10%)
ACL, PCL, MCL, LCL only	6
+ popliteus	1
+ vastus medialis	2
+ MPFL	1
+ PLC	1
ACL, PCL, patella tendon	1
ACL, PCL, PLC, LCL, QT, VMO	1
ACL, PCL, LCL, popliteus, VMO, QT, patella	1
Total	110
Not reported	4

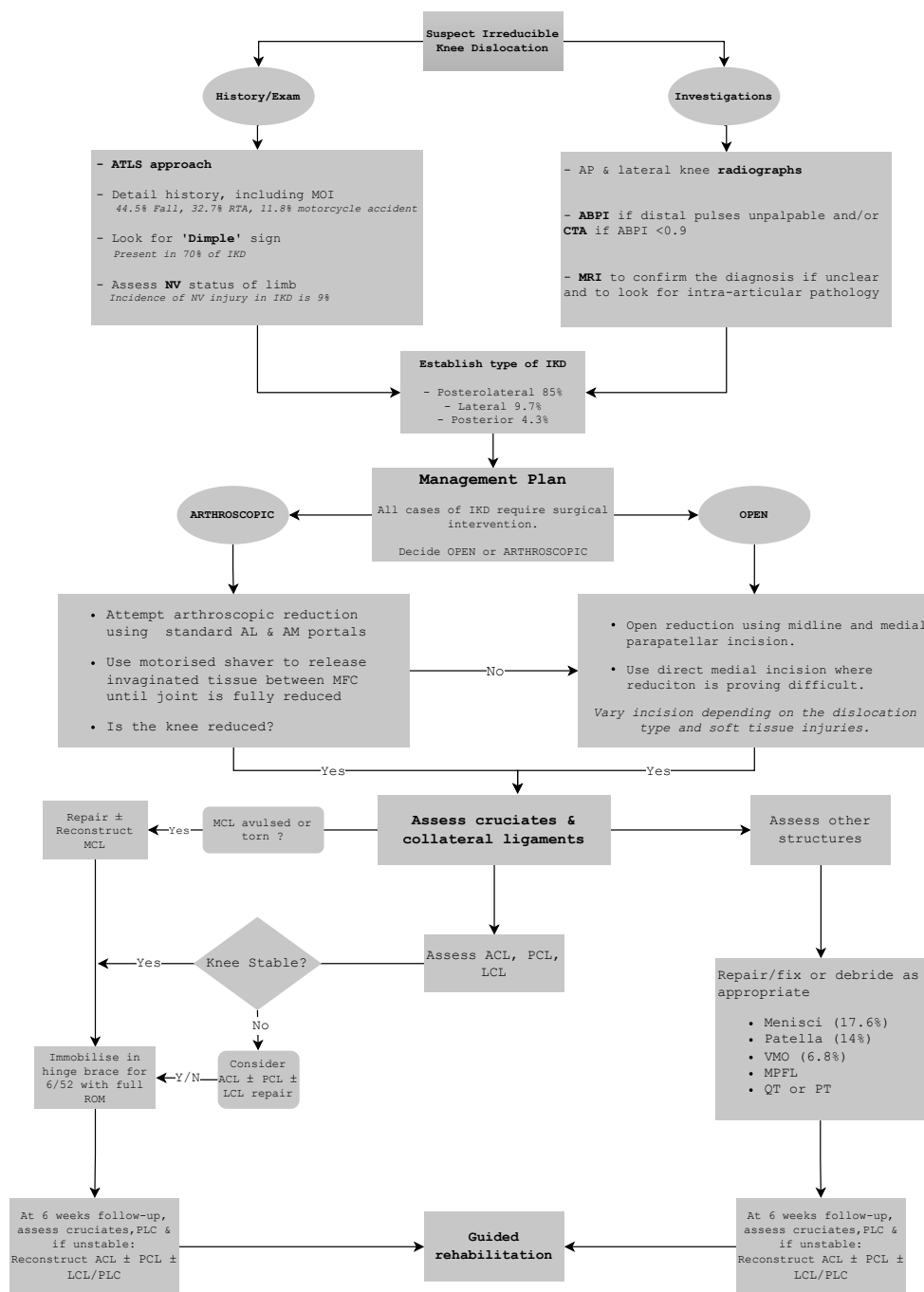
Vascular injury	
Yes	4 (3.6%)
No	107 (96.4%)
Total	111
Not reported	3
Nerve injury	
Yes	6 (5.4%)
No	105 (94.6%)
Total	111
Not reported	3

The pattern of knee ligament repair and/or reconstruction.

Ligament repairs	Repair ^a	Reconstruction	Total
No ligament repairs = 20 (19%)	-	-	20
MCL = 34 (32.3%)	MCLr only = 28	MCLR only = 3	34
	MCLr + gastrocnemius repair = 1		
	MCLr + semimembranous repair = 1		
	MCLr, MPFLr = 1		
MCL, ACL, PCL = 29 (27.6%)	MCLr, ACLr, PCL-R = 16	MCL-R, ACLR, PCLR = 2	29
	MCLr, ACLr, PCLr = 2	MCLr + R, ACLr, PCLr = 1	
	MCLr, ACL-R, PCLr = 1	MCLr + R, ACLR, PCLr, MPFLr, PLCr, oMMr + LMr = 1	
	MCLr, ACLr, PCLr, QTr, VMO advancement = 1	MCLr + R, PCLR = 1	
	MCLr, ACL-R, PCL-R, LMr = 1		
	MCLr, ACLr, PCLr, pLM, PHMMr = 1		
	MCLR, ACL-R, PCL-R, PMC-R, pMM = 1		
	MCLr, ACL-R, PCL-R, popliteus tendon recon = 1		
MCL, ACL, PCL, LCL = 6 (5.7%)	MCLr, ACL-R, PCL-R, LCLr = 6	-	6
MCL, ACL = 6 (5.7%)	MCLr, ACLr = 3	-	6
	MCLr, ACLr, MMr = 2		
	MCLr, ACL-R = 1		
ACL, PCL = 1	-	ACL-R, PCL-R = 1	1
ACL, PCL, LCL = 2	ACLR, PCLr, LCLr, LMr = 1	ACL-R, PCL-R, LCL-R = 1	2
MCL, PCL = 1	MCLr, PCL-R, Lateral release = 1	-	1
Miscellaneous = 6 (5.7%)	ACLR = 1	PCL-R = 1	6
	MPFLr = 1		
	Patella tendon repair = 1		
	QTr + fasciotomies = 1		
	VMOr = 1		
Not clearly reported = 9	-	-	9
Total = 114	-	-	114

r: repair; R: reconstruction; p: partial; o: open; ACL: anterior cruciate ligament; PCL: posterior cruciate ligament; MCL: medial collateral ligament; LCL: lateral collateral ligament; PLC: posterolateral corner; PMC: posteromedial corner; MPFL: medial patello-femoral ligament; MM: medial meniscus; LM: lateral meniscus; QT: quadriceps tendon; VMO: vastus medialis obliquus.

^a Repair is based on MCL.



A proposed management algorithm for the irreducible knee dislocation.

Limitations

- Studies provided level IV evidence
- Low study numbers
- Lack of control group
- Heterogeneity in the cases, with no consistency regarding patient assessment, investigation, intervention or follow-up.
- The MINORS scores ranged from 3 to 12 for noncomparative studies (maximum score, 14) and the single comparative study scored 18 (maximum score, 24).

Conclusion

- **PL dislocations** are the most common type.
- Reduction to block is most commonly caused by **MCL**, medial retinaculum and capsule and VMO.
- **ACL, PCL, MCL** ± other structures are most common pattern of injury to ligament.
- MCL will be the most commonly repaired ligament.
- The **dimple sign** is often present & is highly pathognomonic of IKD.
- The incidence of NV is uncommon.
- **Medial skin necrosis** and postoperative knee stiffness are the most common post-operative complications

References

- For full references please download:
- Malik SS, Osan JK, Aujla R, Aslam N, D'Alessandro P, MacDonald PB. A systematic review on management and outcome of irreducible knee dislocations. Orthop Traumatol Surg Res. 2022 Dec;108(8):103415. doi: 10.1016/j.otsr.2022.103415. Epub 2022 Sep 17. PMID: 36126871.