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How Body Mass Index Impacts the Complications and Outcomes of Patients with Multi-ligamentous Knee Injuries Who Undergo Operative Repair: A Review of the Current Literature

Stephanie Ferrante BS, Jeremy Adelstein BS, John Quinn, Parker Cavendish MD, Alex DiBartola MD, Eric Milliron MD, David Flanigan MD, Robert Magnussen MD, **Robert Duerr MD**





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Background

- Multi-ligamentous knee injuries (MLKI) are defined as injury to at least two of the four major ligaments on the knee, and can be associated with neurovascular injuries and worse patient outcomes. ¹⁻⁵
- “Ultra-low velocity knee dislocations” are knee dislocations resulting from simple falls during activities of daily living; these occur almost exclusively in patients with BMI>30.⁶
- Studies are investigating if there is a link between obese MLKI and higher complication rates and worse patient reported outcomes.



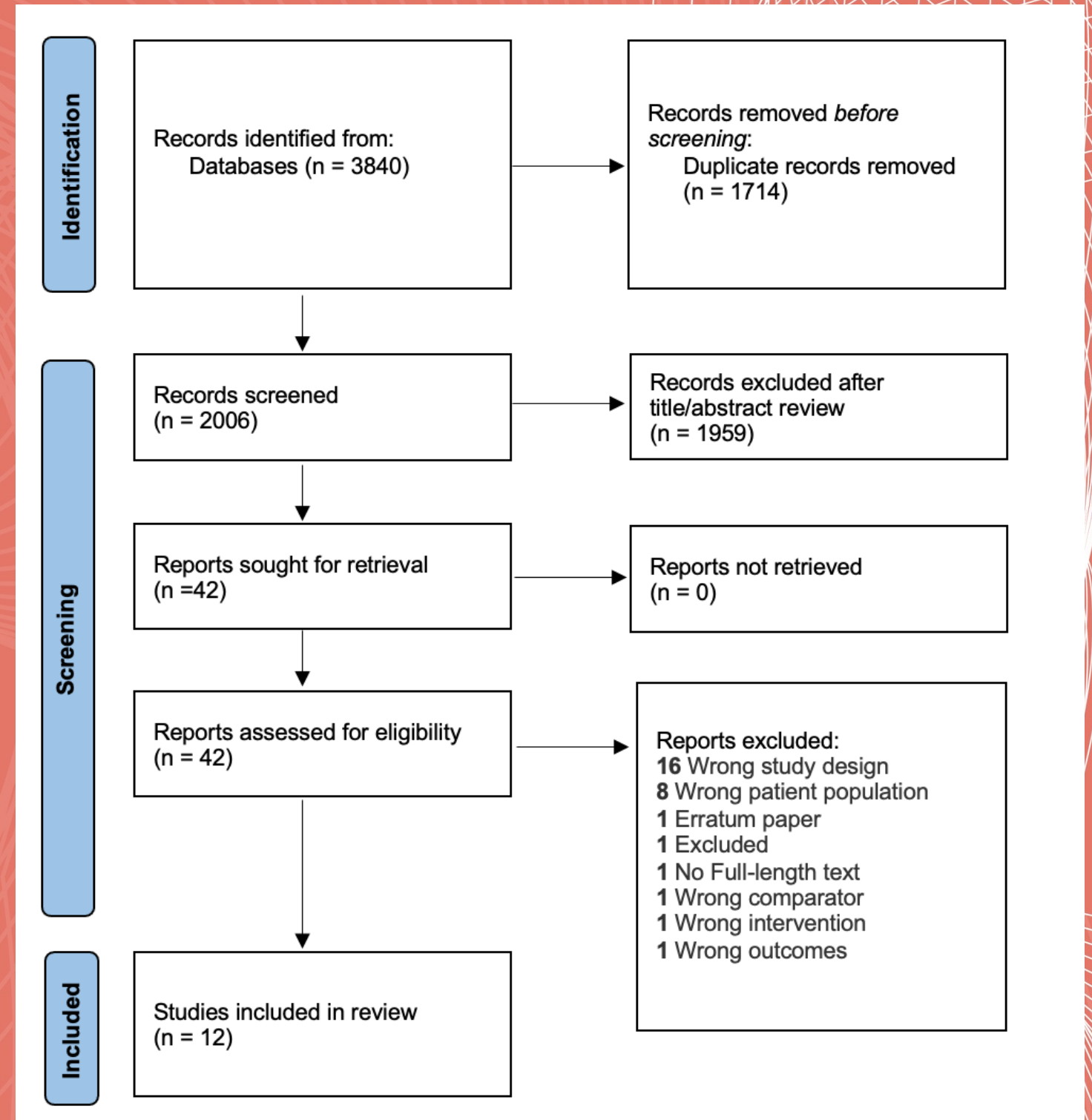
Background

- Purpose: Systematically review the literature regarding the impact of BMI on clinical outcomes of patients with MLKIs and if BMI serves as a risk factor for MLKI complications.
- Hypothesis: Obese patients (BMI>35), would have poorer patient reported outcomes (PROs), clinical outcomes, higher medical costs, and increased risk of clinical complications compared to those classified as non-obese.



Materials and Methods

- PRISMA guidelines followed
- Inclusion criteria: adults or minors with a two or more knee-ligament injury, comparison between obese and non-obese patients
- Exclusion criteria: single torn knee-ligament injury



Results

Paper	Heitmann et al.	Rosteius et al.
Non-obese (n)	56	22
Lysholm	85.6 ± 5.6	80.7 ± 13.7
IKDC	80.1 ± 7.5	86.6 ± 13.4
Pre-op Tegner	6	-
Post-op Tegner	5	-
Obese (n)	4	5
Lysholm	31.3 ± 7.1	62.6 ± 8.9
IKDC	37.4 ± 13.4	52.0 ± 24.9
Pre-op Tegner	4	-
Post-op Tegner	2.5	-

Paper	Werner et al.
Ultra Low Velocity (n)	11
Lysholm score	55 (SD: 11.8)
High Velocity (n)	10
Lysholm score	80.5 (SD: 10.1)
Low Velocity (n)	14
Lysholm score	89 (SD: 5.1)

- Sanders et al. stated "a BMI of >30 kg/m² was predictive of lower IKDC (p = 0.0009) and Lysholm (p = 0.0008) scores."

Tables 1 and 2: PRO data demonstrating lower scores among obese and ultra-low velocity groups.



Results

Paper (obese vs non-obese)	Vascular Injury		Nerve Injury	
	Obese	Non-Obese	Obese	Non-Obese
Lian et al. (25 vs 83) ¹¹	0 (0%)	6 (7.2%)	5 (20.0%)	7 (8.4%)
Ridley et al. (39 vs 87) ²²	3 (7.7%)	2 (2.3%)	8 (20.5%)	10 (11.5%)

Paper	Vascular Injury		Nerve Injury	
	ULV MLKI	Non-ULV MLKI	ULV MLKI	Non-ULV MLKI
Werner et al(25 vs 83)	28.1%	4.7%	39.1%	8.4%
P-value	P<0.001		P<0.001	

Tables 3 and 4: Neurovascular injury comparisons

Results

Paper (obese vs non-obese)	Hardware Removal		Infection		Revision Surgery/ Failed Graft		Arthrolysis/MUA	
	Obese	Non-Obese	Obese	Non-Obese	Obese	Non-Obese	Obese	Non-Obese
Cook et al. (43 vs 89) ²⁹	0 (0%)	6 (6.7%)	4 (9.3%)	1 (1.1%)	2 (4.7%)	10 (11.2%)	5 (11.6%)	14 (15.7%)
Lian et al. (25 vs 83) ¹¹	0 (0%)	5 (6.0%)	0 (0%)	2 (2.4%)	4 (16.0%)	6 (7.2%)	0 (0%)	21 (25.3%)
Ridley et al. (39 vs 87) ²²	-	-	-	-	2 (5.1%)	7 (8.0%)	5 (12.8%)	12 (13.8%)

Table 5: Complication rates between obese and non-obese



Results

Most important finding: Of all the patients PROs compared, whether between obese vs. non-obese or ULV vs. non- ULV, lower scores were demonstrated among the obese and ULV patients.



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Results

- Vaidya et al. and Lian et al. demonstrated longer operating times among obese populations compared to non-obese.
- Qin et al. observed less physical therapy (PT) visits among obese patients and subsequently lower costs for PT.



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Conclusions

- Patient reported outcomes were collectively lower among obese patients with MLKIs and those whose injury was classified as ULV.
- Non-obese patients demonstrated higher rates of hardware removal, revision surgery/graft failure, and need for arthrolysis/MUA, while there was no significant difference in concomitant neurovascular injury or infection rates among the two groups.



Thank You!



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