

Postsurgical complications after total knee arthroplasty and preoperative assessment of health

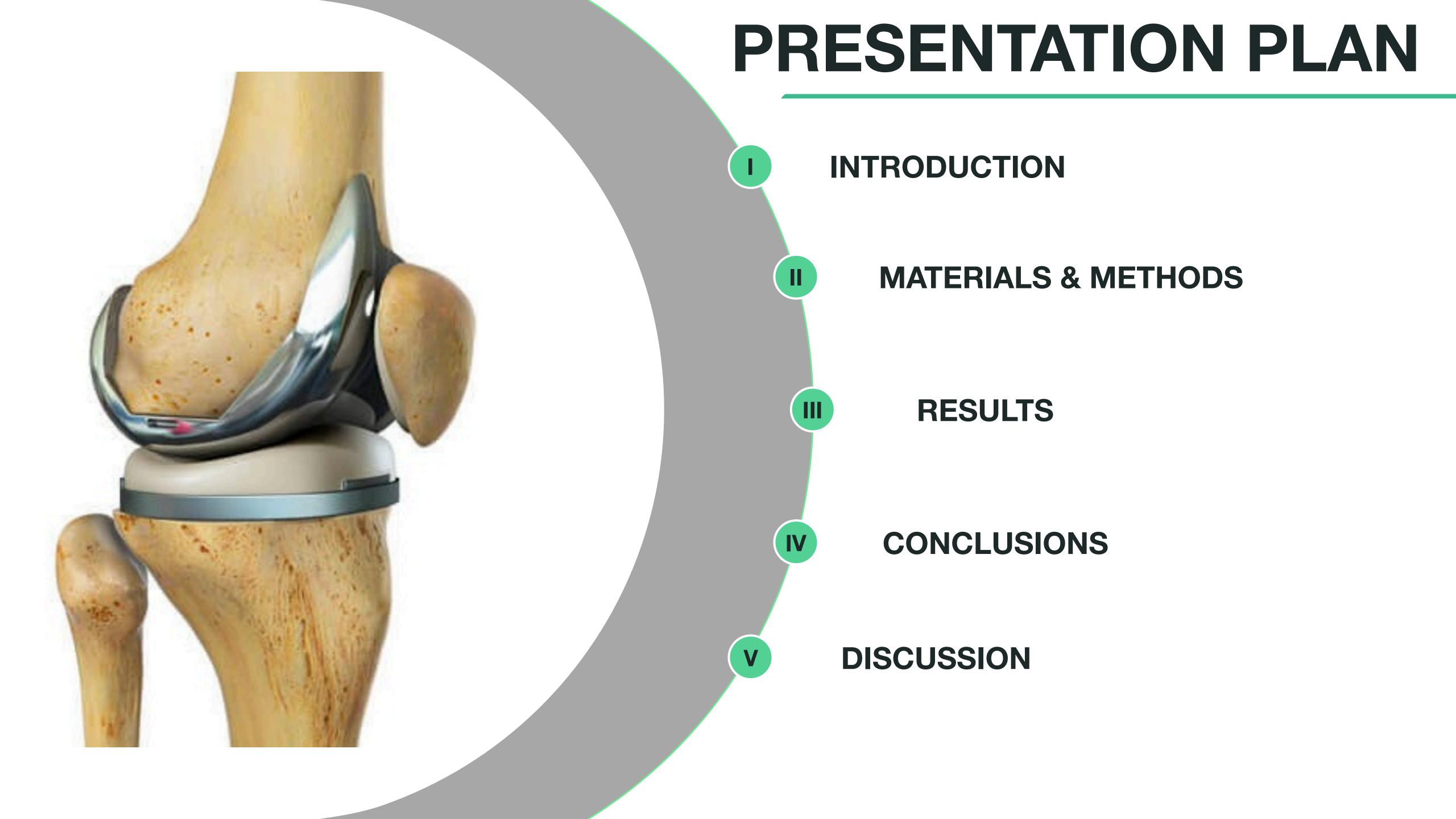
Authors: Jakub Drąg, Adam Smolik & Tomasz Król

Work tutor: dr n. med. Przemysław Bereza

Department of Orthopeadic and Traumatology of Medical University of Silesia, Katowice Head of department: prof. dr hab. n. med. Damian Kusz







Total knee arthroplasty

Total knee arthroplasty (TKA) is an operation to restore motion to a knee joint and is one of the most profitable and consistently successful surgeries performed in orthopedics.

Reported main outcomes are pain relief, functional restoration and improvement in quality of life.

TKA provides reliable results especially for patients suffering from degenerative osteoarthritis.

33192 TKA in 2019 - Polish NHF





Common causes of knee pain

- Degenerative Osteoarthritis (OA)
- Inflammatory arthritis
- Post-traumatic arthritis
- Irreversible damage to the knee joint







Bleeding

Blood clots in legs or lungs

Infection (SSI, PJI) •

Vascular and nerve injuries

Aseptic loosening

Early postsurgical complications



First developed in 1941 by the American Society of Anesthetists, an organization that later became the ASA.

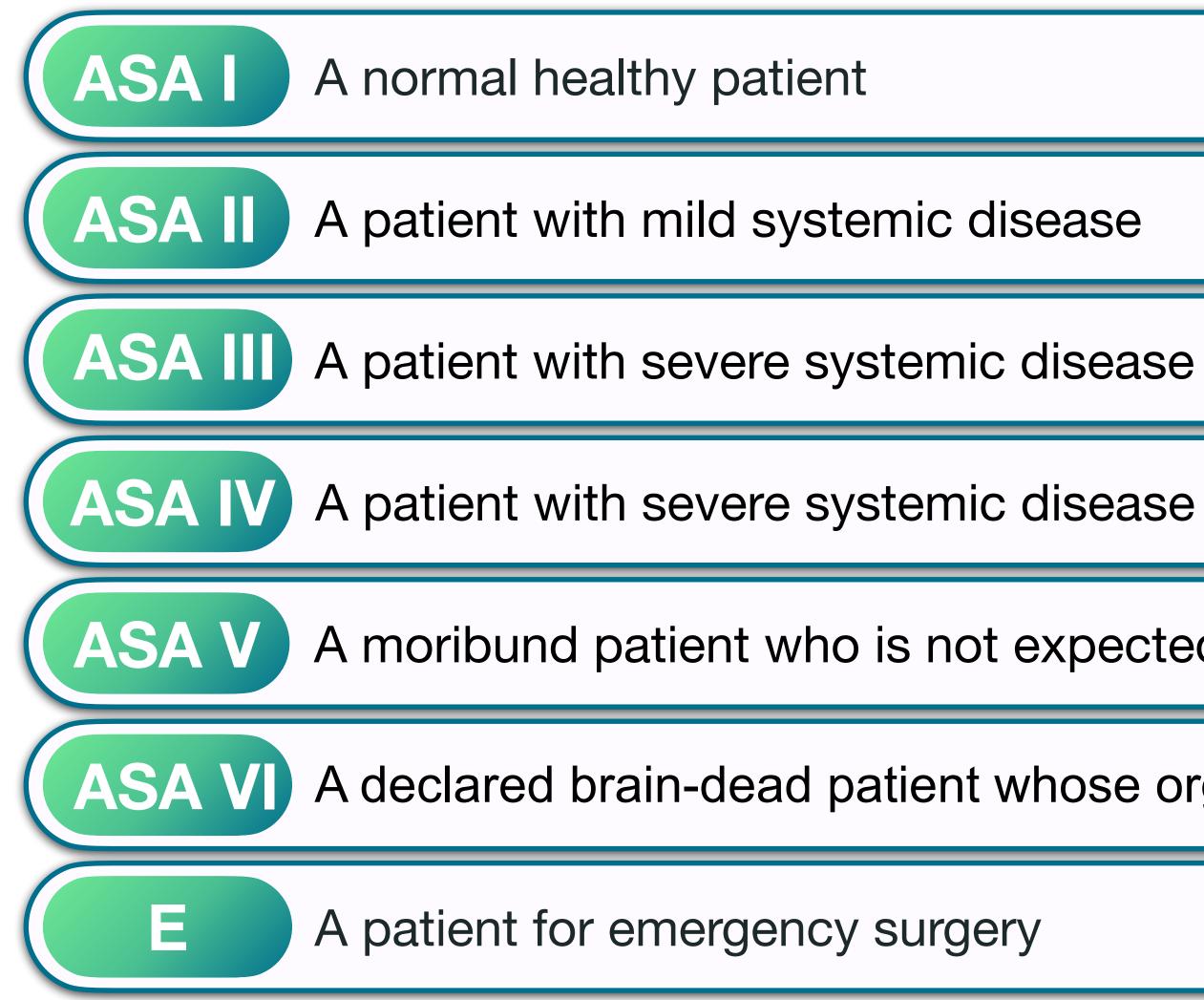
Anesthesiologists use the system to describe a patient's preoperative and comorbid conditions before surgery and to properly stratify outcomes. Describing patients' ASA score is used for recordkeeping, for communicating between colleagues, and to create a uniform system for statistical analysis.

ASA Physical status classification system

This classification cannot serve as a direct indicator of operative risk







A patient with severe systemic disease that is a constant threat to life

A moribund patient who is not expected to survive without the operation

A declared brain-dead patient whose organs are being removed for donor purposes



The aim

The purpose of this study was to determine the probability and types of postoperative complications basing on the patients ASA score as well as BMI, age and laboratory tests.





The Department of Orthopaedics and Traumatology of Medical **University of Silesia database**



January 2019 to May 2019







Comparison of: medical history, laboratory results and postoperative consultations

Male

33%

A total of **100 patients** 67 female & 33 male

Female **67%**

m,

Materials & methods

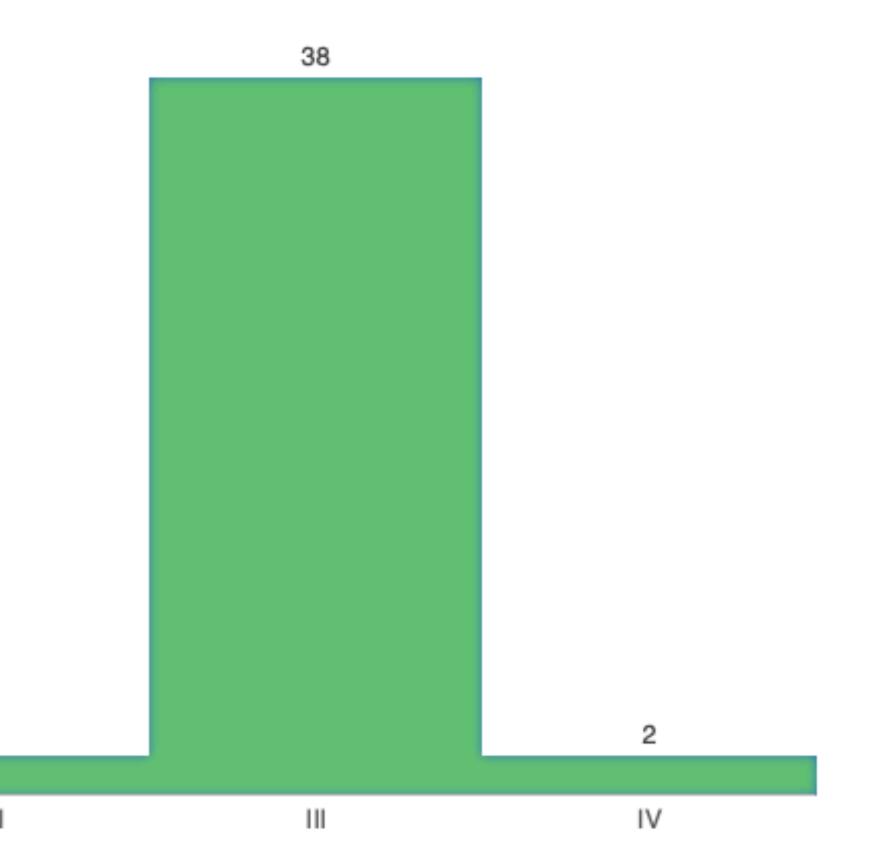
	Wiek	Płeć	BMI	Data przyjęc Data zabiegu Data wypisu
1	70			
2	74			
2	69			
1				
4	64			
0	50			
2 3 4 5 6 7	58			
/	60	M	+	
8	64	к		
9	71	M		
10	78			
11	64			
12				
13	85			
14	67			
15	48			
16	67			
16	55	M		
17	63	к	+	
18	65	к		
19	65			
20	69			
21				
22 23	79			
23	67			
24	64			
25	73	M		
26	68	к		
26 27	68	к		
27	75			
28	70			
29				
30	69			
- 31	69			
31 32	65			
33	82			
34	78	M		
35	66	к		
36	70			
37	64			
20	59			
20	56			
33 34 35 36 37 38 39 40	69			
40				
41	74			
42	61			
42	72			
44	73			
45	48	Μ		
46	79			
47	79			
48	76			
49	53			
50	66			
51				
50 51 52 53 54	66			
52	76			
53	68			
54	79			
22	67	К		
20	71	к		
55 56 57 58	73			
58	60			
59	75			
59 60 61 62	53			
61				
62	68			
63	57			
63 64 65	67			
66	70			
66	75	K		
66	71			
		1		

Pobyt (dni)	KKCZ	Dł zabiegu	Leu	ukocyty	Ervtrocvtv	Hemoglobina	Hematokryt PL	.T B	iałko całko Ki	reatynina Cl	RP	INR	APTT	Glukoza BOM	Powikłania A	ASA
1	3	2	120	6,5			39,1	243	7,68	N		1	0,95	116 N		
٤	3	0	90	9,65	4,7	14,1	42	271	7,56	0,91 N		1	0,98	N		
9		0	120	5,26	4,25	13,5	39,3	175	8,01	0,7 N		1	1,17	99 N		
9)	2	85	7,39	4,62	13,1	39,3	227	7,84	0,52 N		1	1,21	99 N		
																-
10		0	85	4,11			39,7	245	8,26	0,65 N		0,9	1,11	104 N		
12		0	80	11,42		12,8	38,5	223	7,51	0,88	11,5	1	0,98	150 N		
10		0	85	8,84			44,8	272	7,4	0,93 N		1,1	1,02	118 N		
8		0	90	7,08		13,7	40,9	238	8,24	1,1	9,5	1	1,08	111 N		
9		0	75	7,32		12,9	38,5	212	7,35	1,34 N		1	1,07	119 N	ZUM Diversities adverte	
11		0	85	7,81			40,1	192	7,68	0,56 N		1	0,91	103 N	ZUM P.Mirabilis, obrzęk podudzia	
12		2	75 120	5,89 10,46			42,9	184 232	7,34	1,03 N 0,91 N		0,9	1,04	125 N 107 /		
		0	120	10,40	4,34	13,2	39,0	232	7,56	0,91 N	19	0,9	0,91	107 7		
9		0	120	7,19	3,98	13,9	39,7	268	7,24	0,73	19	0,9	0,78	105 N	Odleżyna na pięcie, dystalna cz podu	2/
8		0	30	4,62			41,3	158	7,24	0,73 0,78 N	0	0,9	0,78	95 /	Odlezyna na pięcie, dystalna cz podc	21
10		0	80	9,38			41,6	391	8,94 /	0,78 N		1	0,77	103 N	Krwiaki prawej KD	
8		0	135	4,93			31,3	309	6,61	0,61 N		1,1	0,98	87 N	Gorączka 5 dnia po zabiegu	
	-		155	4,75	4,57	10	51,5	507	0,01	0,01 14	20,6	1,1	0,70	0, 11		
8	3	1	110	7,75	3,19	10,4	30,5	204	6,66	0,45	5,2	1	0,9	90 N		
8	-	0	155	6,54		12,5	38,6	218	7,31	1,02 N	3,2	1	0,87	115 N		
8		0	85	11,5			41,3	266	8,12	0,89 N		1	0,84	123 N		
9		0	75	7,5			41,5	268	7,42	0,57 N		1	0,92	115 N	Gorączka przez 4 dni po zabiegu i ob	
	1	-		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-,0	14		200		5,57 1	36,3		0,72		Condense biller + din bo zablege 100	
16	5	0	85	8,38	4,72	14,6	42,6	299	7,28	0,87 N	50,5	0,9	0,87	131 N	Obrzęk w 8 dobie, zakrzepica ż. Podu	
10		0	90	7,02			38,5	299	7,01	0,58 N		1	0,98	96 N		
10		0	90	6,53			44,4	258	7,5	0,83 N		1	0,93			
10		0	90	8,19			40,2	317	7,6	0,69 N		0,9	0,9	153 N		
8		2	85	4,51			40,4	233	7,01	0,76 N		1	1,13	119 N		
8	3 (0	80	8,74		15,1	45,6	237	7,5	1,03 N		0,9	0,95	97 N		
10) (0	105	6,55	4,3	14	41	233	7,95	0,82 N		1	1	110 N	Obrzęk i krwiak na podudziu i w okol	
8	3	0	125	9,2	4,42	14,2	42,2	181	7,97	1,21 N		0,9	0,92	141 N		
8	3	0	90	5,01	4,81	15,3	43,6	153	7,49	1,21 N		1,21	0,92	122 N		
9)	0	100	15	5	14,4	43,3	268	7,12	0,42 N		1	0,96	100 N	Obrzęk przez 5 dni po operacji	
10		0	105	4,67	4,59	13,8	40,4	218	7,65	0,73	5	1	0,97	104 N		
9		0	185	7,96	4,61	14,8	40,7	240	6,39	0,57 N		1	0,94	188 N		
4	4														artroskopia	
10) (0	115	8,66			43,9	267	7,17	0,54 N		0,9	0,82			
10		0	85	11,32			38,3	358	7,92	0,58	6	1	0,83	109 N		
18		0	105	5,86			46,7	173	7,91	1,21 N		1,4	1,08	116 Cw 1,031		
10		0	90	6,53			39,9	266	7,38	0,88 N		1	0,98	98 N		
9		0	110	7,13			35,9	355	7,05	0,95 N		1,1	1,03	87 N		
9		0	145	8,72			37,1	370	7,13	1,2	13,7	1	0,91	158 N		
9		0	105	5,26			45,1	241	8,56	0,65 N		1,1	0,91	N		
10		0	75	7,11			43,7	262	7,78	0,85 N		1	0,9	106 N	stan miejscowy skóry - antybiotyk	
8		0	80	4,54			35,8	258	7,48	0,79	5,4	1	1,11			
10		0	90	7,37	4,63	12,9	40,1	304	6,75	1,08 N		0,9	0,9	105 N	obrzęk i krwiak w okolicy łydki	
		2	00	7 32	1.04	40.0	20.7	244	7.04				4.00	00.11		-
10		2	80	7,32			38,7	344	7,24	1 N		1	1,03	98 N		
8		0	165	9,19			50,3	226	7,09	0,65 N		1	1,03	116 N		2/
11		0	110 110	5,81		11,9	36,1	203 214	7,55	3,99	6,6 15,5	0,9	1,18	117 N 102 N		
9		0	75	4,68			38,1 39,2	214	7,43	0,79 0,55 N	15,5	0,9	0,98	102 N 220 N		
9		0	100	5,88			42,1	223	6,79	0,55 N 0,86 N		4	0,91	104 N		
9		0	65	5,92			42,1	234	7,08	0,86 N		1	0,85	104 N		
9		0	105	5,21			43,7	207	7,08	0,71 N	9	1	0,94	120 N		
3		0	85	5,39			44,1	372	7,84	0,51 N	0	1	0,92	111 N		
8		0	65	5,69		14,9	36,3	267	7,78	0,53 N		0,9	0,98	136 N		
		2	95	4,49		13,6	41,6	243	7,85	0,64 N		0,9	1,01	86 N		
11		0	90	7,75			41,0	243	7,53	0,68 N		1	0,89	91 N	Gorączka do 3 dnia po zabiegu	
9		0	130	8,82			43,6	266	7,3	0,00 1	5,9	1	0,87	103 N	origina do o ana po zabiega	
		0	80	7,99			44,9	234	8,1	1,08 N	3,7	1	0,87	105 N		
L		-					45	191	7,45	0,68 N		1	0,00	115 N	Ostry napad duszności, zaostrzenie a	
8		0	110	14	4 89	10	44-1	1.41	/ 44-3	11 00 19				113.15		
8 10 8		0 0 N	110	7,4		16 14,6	45	191	7,45	0,68 N		2,1	1,95	104 N	Ostry hapad duszności, zaostrzenie a	





NUMBER OF PATIENTS IN EACH ASA SCORE GROUP



11/111





ASA class and occurrence of complications

Complications ASA Score	NO	YE
	1	C
	44	6
	1	1
	33	5
IV	2	C

ES

The most numerous groups in the queried database were patients with ASA Score II and III.

Small number of patients with ASA score I and IV results from the distinctive character of patients classified to TKA







Complications ASA score	NO	YES
	44	6
	33	6

Liczności, wiersz	44	6	50
Procent całości	49,438%	6,742%	56,180%
Liczności, wiersz	33	6	39
Procent całości	37,079%	6,742%	43,820%
Razem w kol.	77	12	89
Procent całości	86,517%	13,483%	
Chi-kwadrat (df=1)	,22	p= ,6428	
V-kwadrat (df=1)	,21	p= ,6446	
Chi-kwadrat skoryg. Yatesa	,02	p= ,8799	
Fi-kwadrat	,00242		
dokł. p Fishera, jednostr.		p= ,4365	
dwustr.		p= ,7577	
Chi-kwadrat McNemary A/D	27,38	p= ,0000	
Chi-kwadrat McNemary B/C	17,33	p= ,0000	

We've classified the patient with ASA score II/III to a ASA III score after phone consultations.

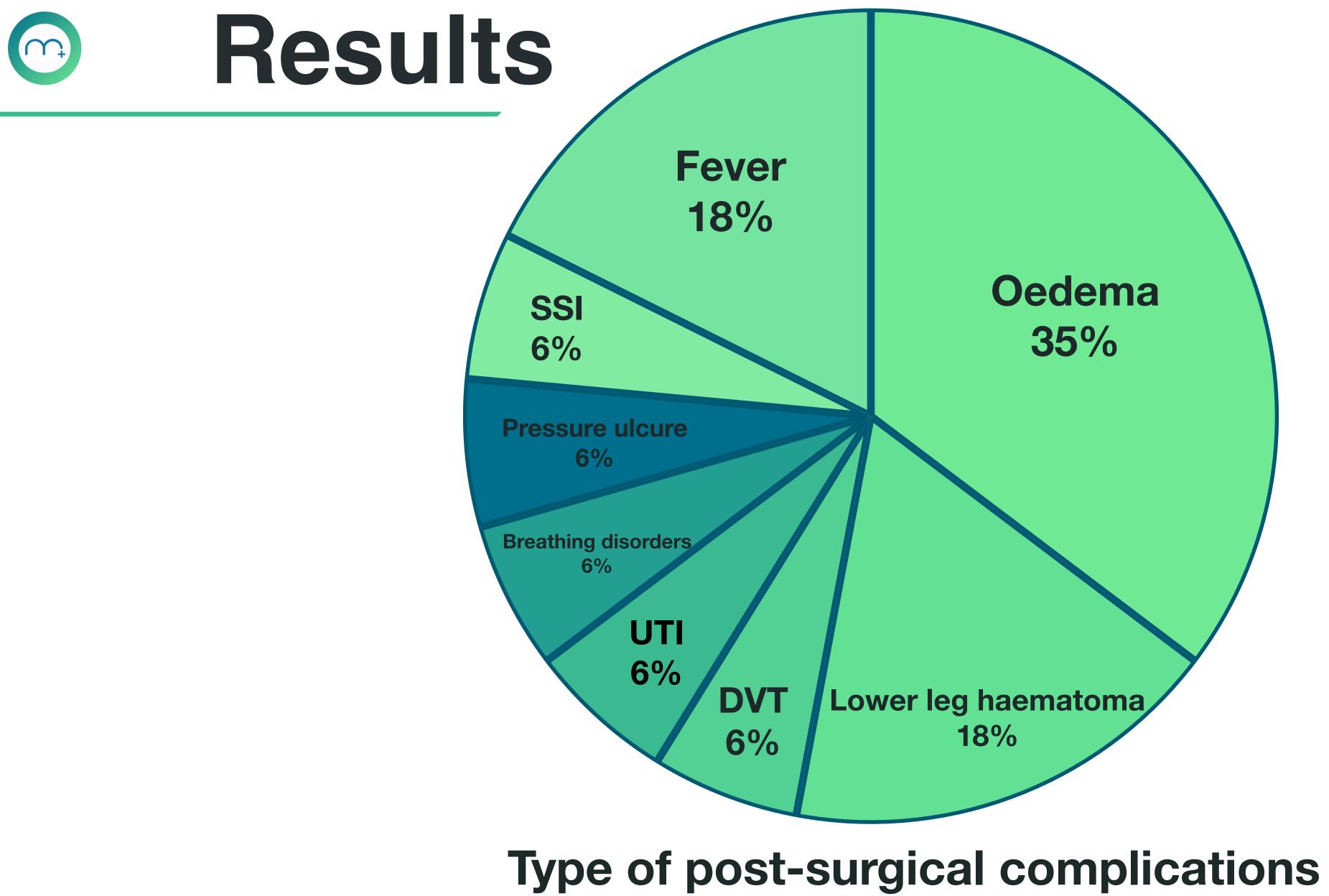
After excluding ASA score groups I and IV due to being statistically irrelevant, we can observe that the higher the ASA score group the higher the percentage of post-surgical complications (12% in ASA II and 15% ASA III).

Statistically, there is no correlation between ASA II and ASA III groups regarding the occurrence of post-surgical complications as *p***=0.64**.









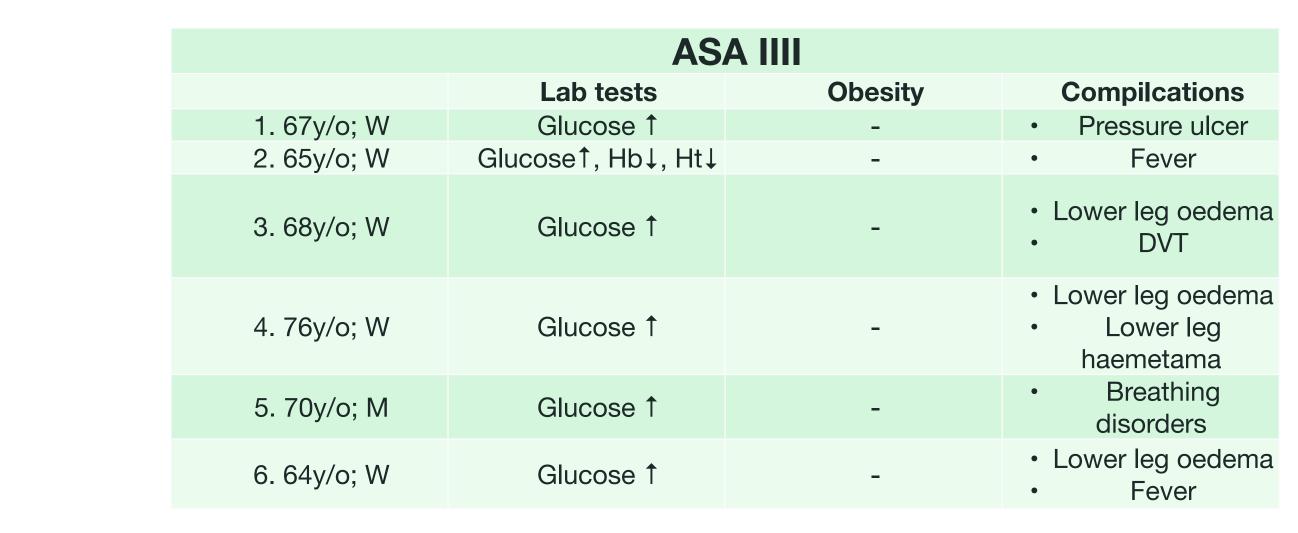
Results

Comparison of complications

ASA II							
	Lab tests	Obesity	Compilcations				
1. 64y/o; W	Glucose 1	-	UTILower leg oedema				
2. 63y/o; W	Glucose 1	+	Lower leg haemetama				
3. 65y/o; M	Glucose ↑, RBC ↓	-	 Lower leg oedema Lower leg haemetama 				
4. 79y/o; M	Glucose 1	-	Exanthem				
5. 68y/o; W	Ν	-	• Fever				
6. 66y/o; W	RBC 1; Creatinine 1	-	Lower leg oedema				

When it comes to laboratory tests, the only common variable is glucose. In the queried group, 64/100 patients' glucose 1 - in **11(17%)** cases, complications occurred.

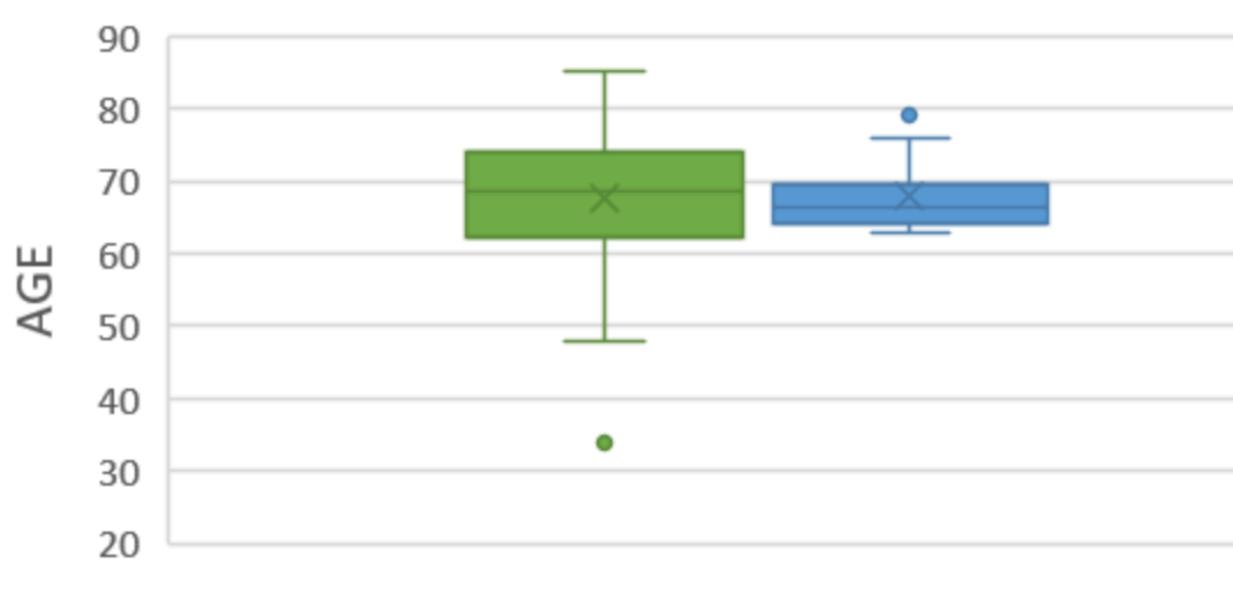
2/100 patients had BMI>30 - correlation excluded due to a small number of patients.







The influence of the patient's age on the occurrence of complications



Complications

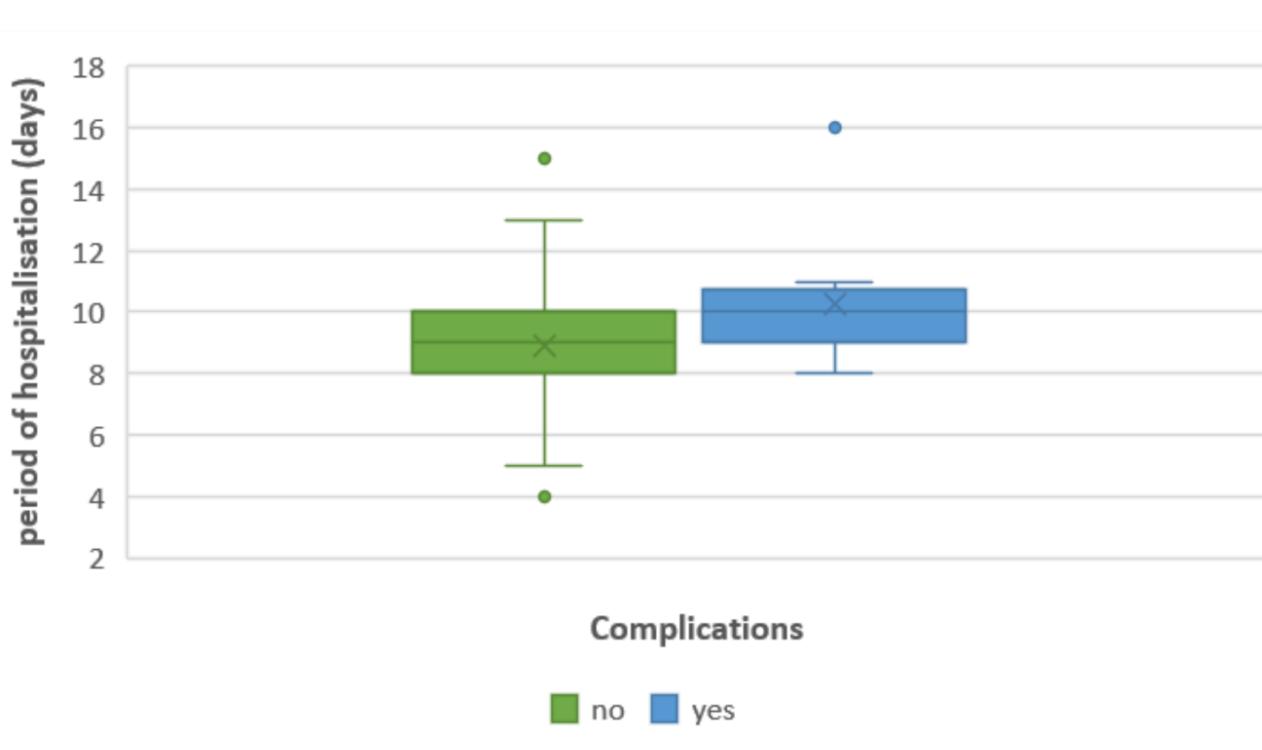


There are **no** significant differences between the groups





Comparison of hospitalization time with the occurrence of complications



The mean hospitalization time is **9,2** days

When it comes to hospitalization time when any complication occurs it is - **10,2** days

ASA II - **10,1** days ASA III - **10,3** days



Conclusions

There is no correlation between ASA Score groups II & Ill and the occurrence of postsurgical complications following the TKA.

Basing on the following research we can deduce that the TKA is a relatively safe procedure with overall low risk of post-surgical complications.

We found no correlation between post-surgical complications and different factors like patients age, laboratory test results and medical history.





Bibliography

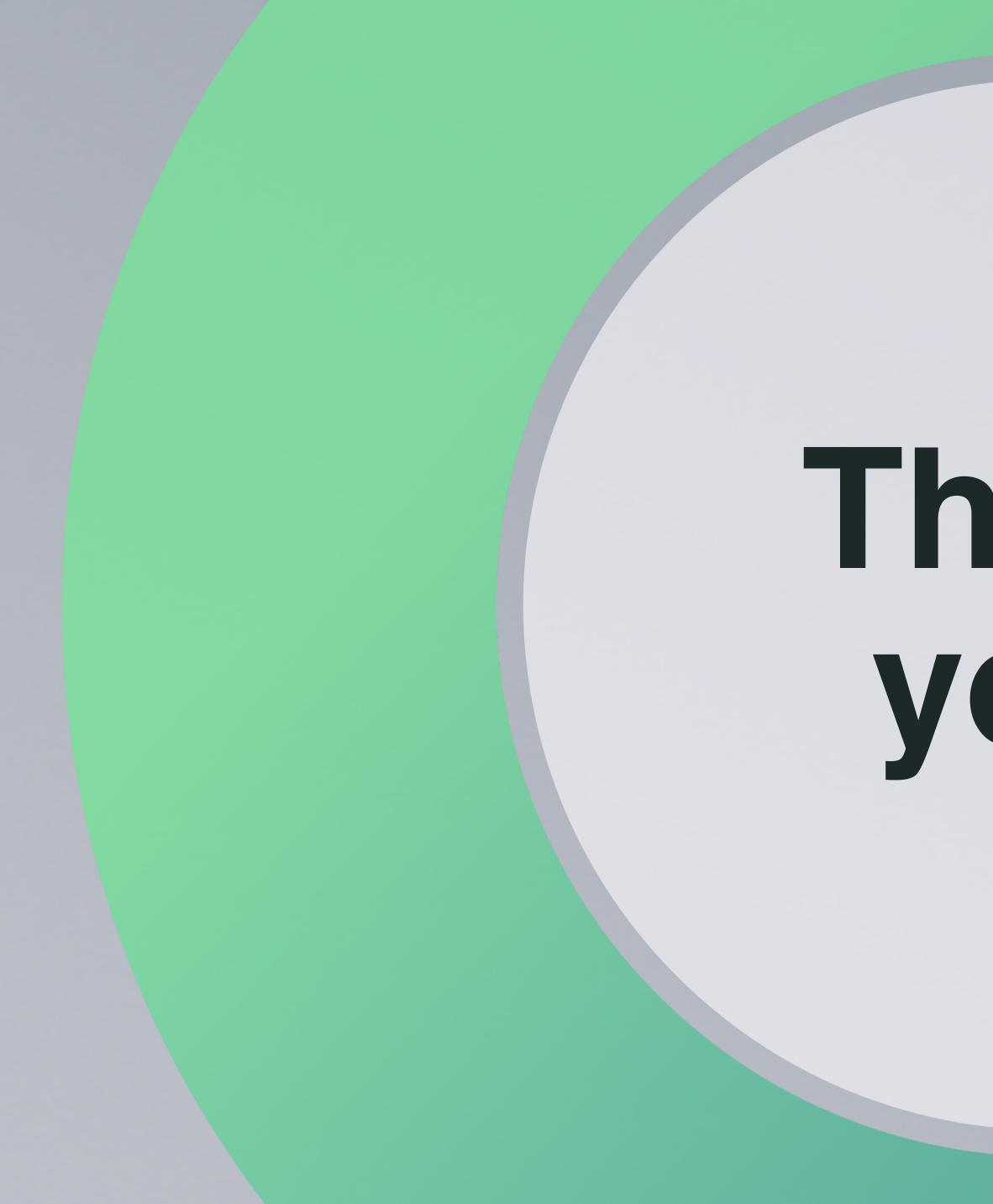
" ASA Physical Status Classification System | American Society of Anesthesiologists (ASA)." Asahq.org, 2014, www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system.

Azar, Frederick M, et al. Campbell's Operative Orthopaedics. 13th ed., vol. 1, 2017.

Knuf, Kayla M., et al. "Clinical Agreement in the American Society of Anesthesiologists Physical Status Classification." Perioperative Medicine, vol. 7, 19 June 2018, www.ncbi.nlm.nih.gov/pmc/articles/ PMC6008948/, 10.1186/s13741-018-0094-7. Accessed 20 Nov. 2020.

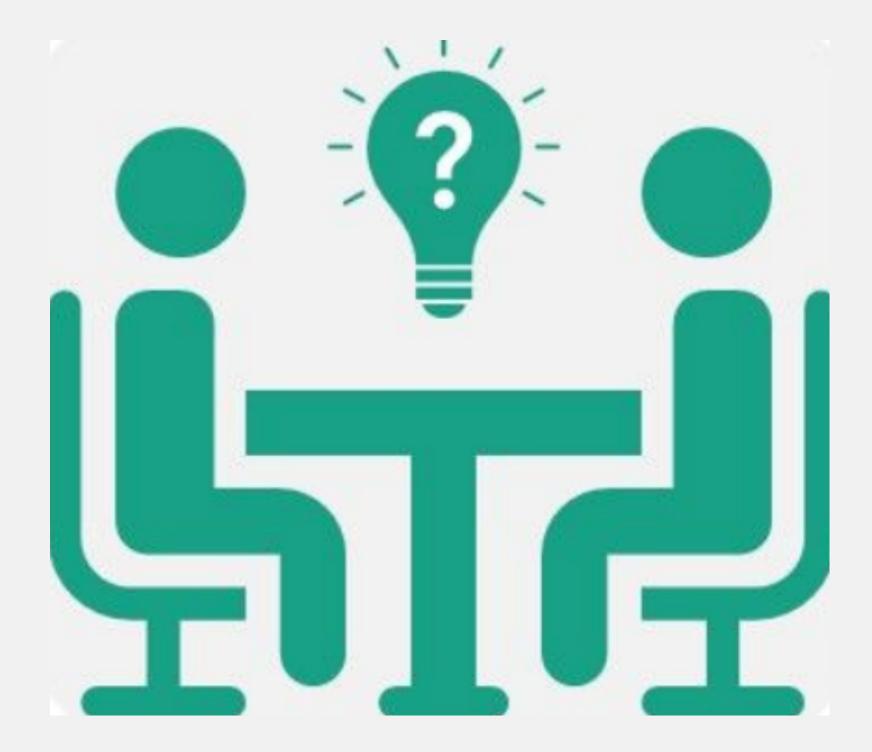
Varacallo, Matthew, and Norman A. Johanson. *Total Knee Arthroplasty*. 17 Dec. 2018, www.researchgate.net/publication/329718421_Total_Knee_Arthroplasty.





Thank you!





Discussion