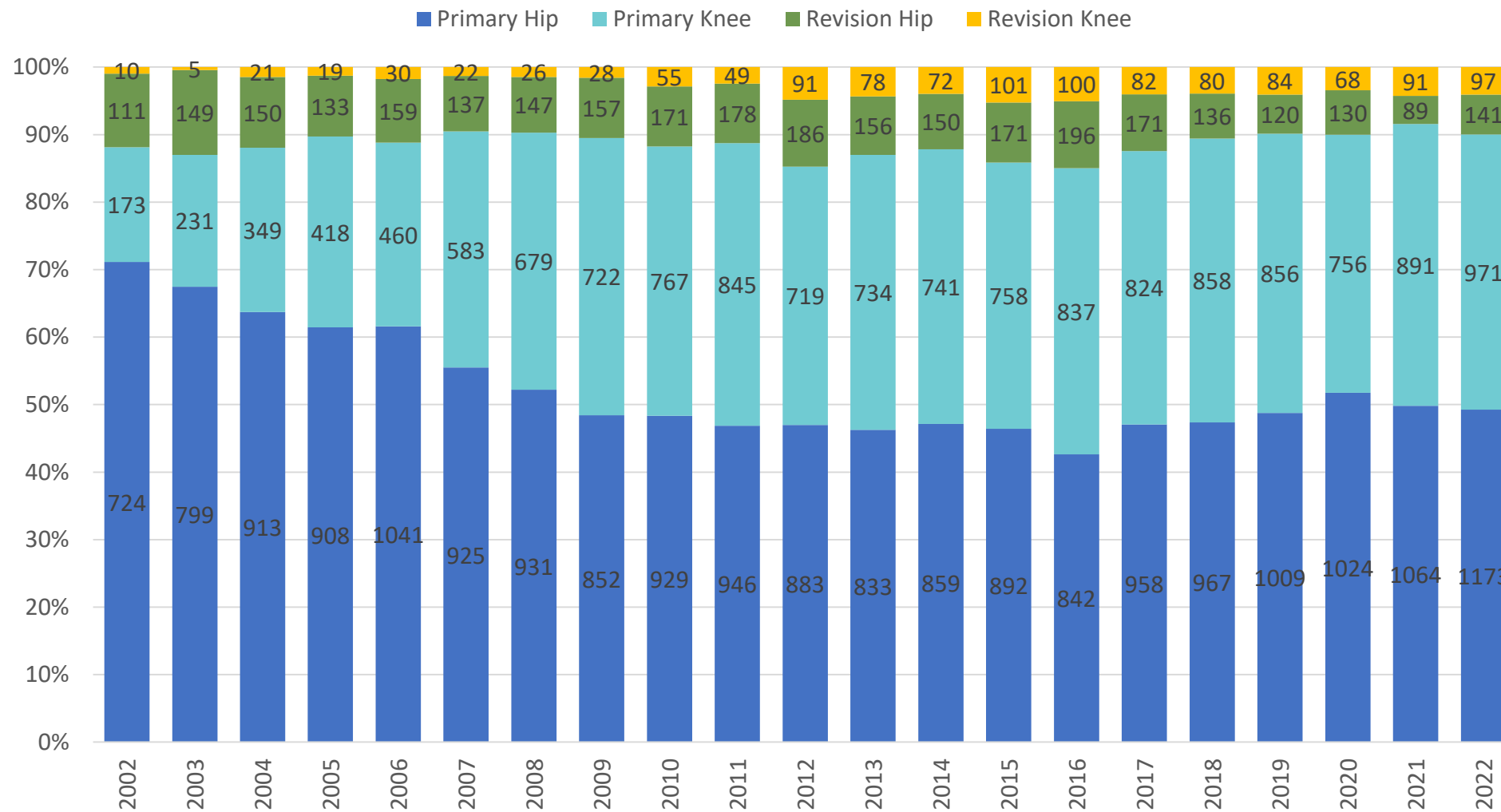


VALDOLTRA HIP ARTHROPLASTY REGISTRY REPORT 2002-2022

Vesna Levašič, PhD, Mateja Blas, MSc, Asst. prof. Simon Kovač, PhD, Prof. Dr. Ingrid Milošev, PhD

Entries to Valdoltra Arthroplasty Registry 2002-2022



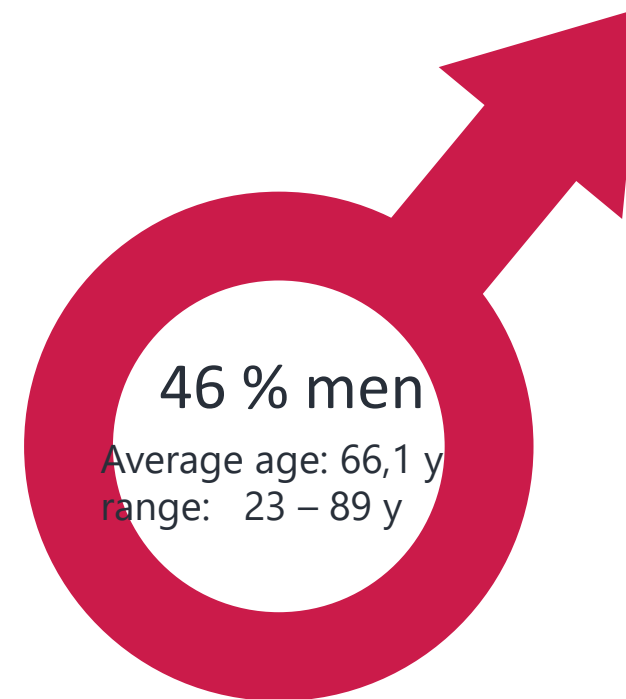
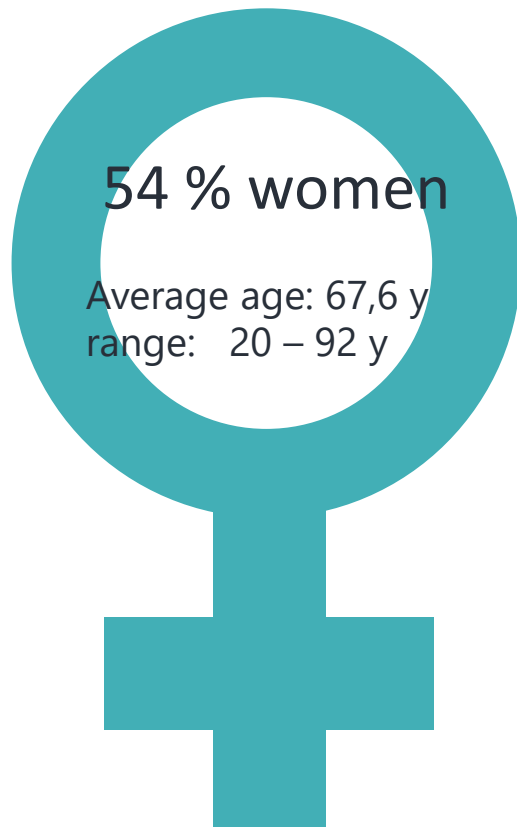
01

PRIMARY TOTAL HIP ARTHROPLASTY

2022

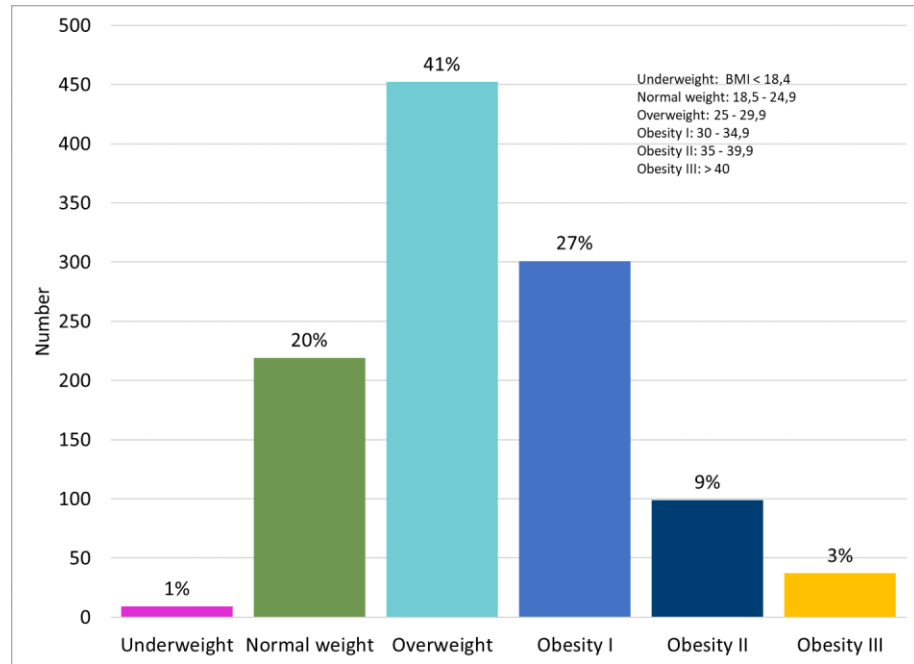
Primary total hip arthroplasty 2022

1173 Primary total hip arthroplasties at 1138 patients (35 patients operated on both sides)

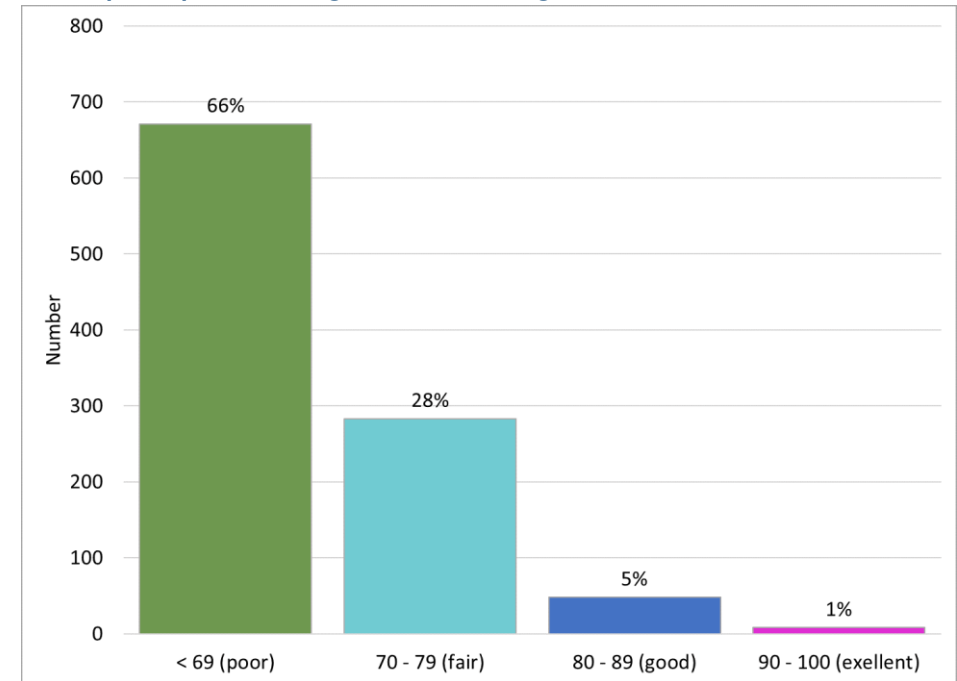


Primary total hip arthroplasty 2022

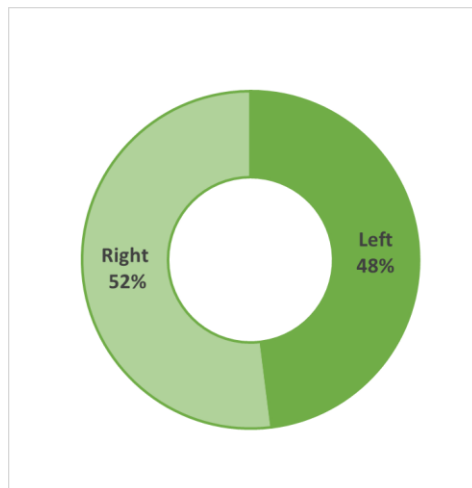
BMI, average: 29.1, range: 16 - 49



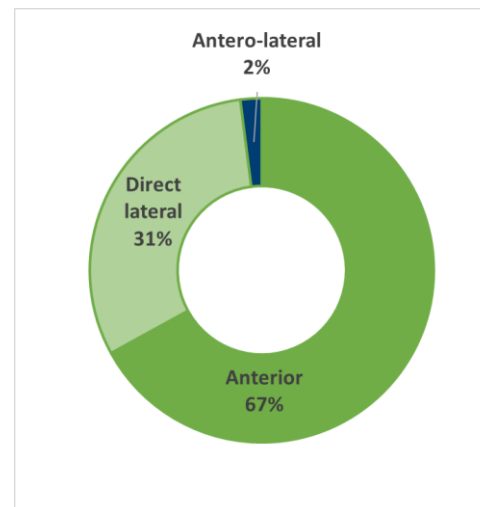
HHS preop., average: 59.5, range: 11 - 100



Surgery side

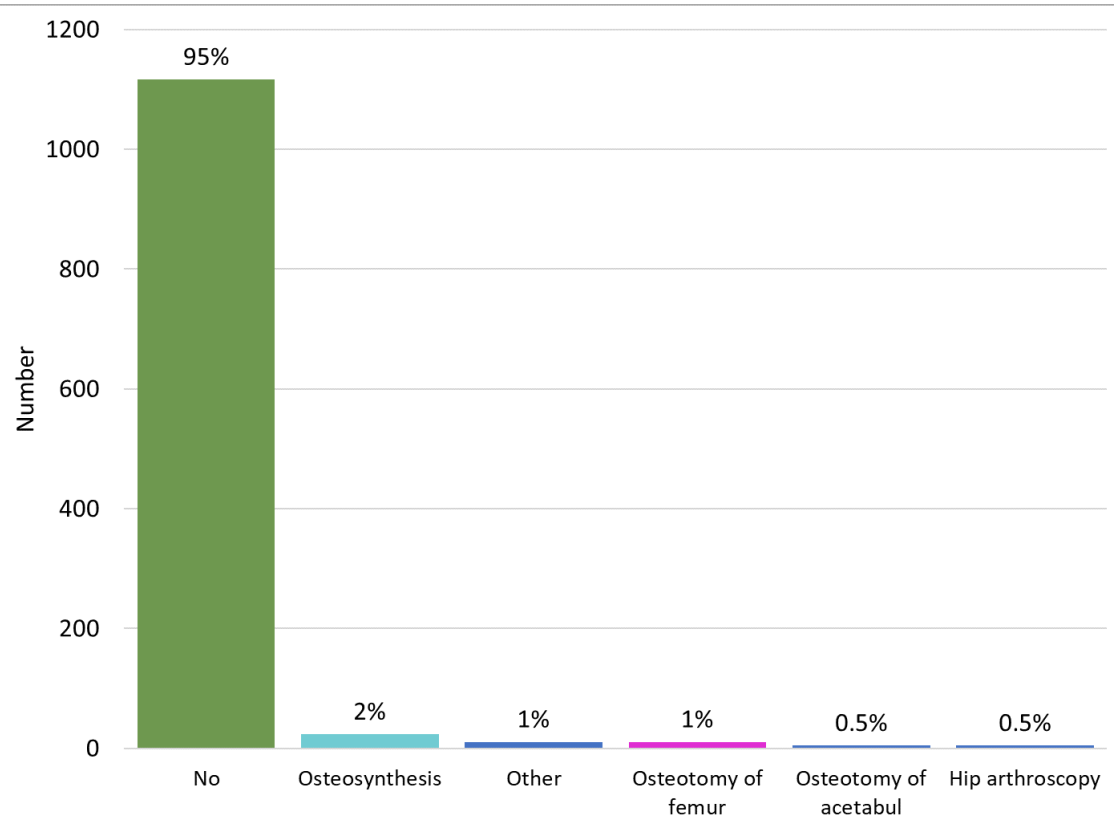


Approach

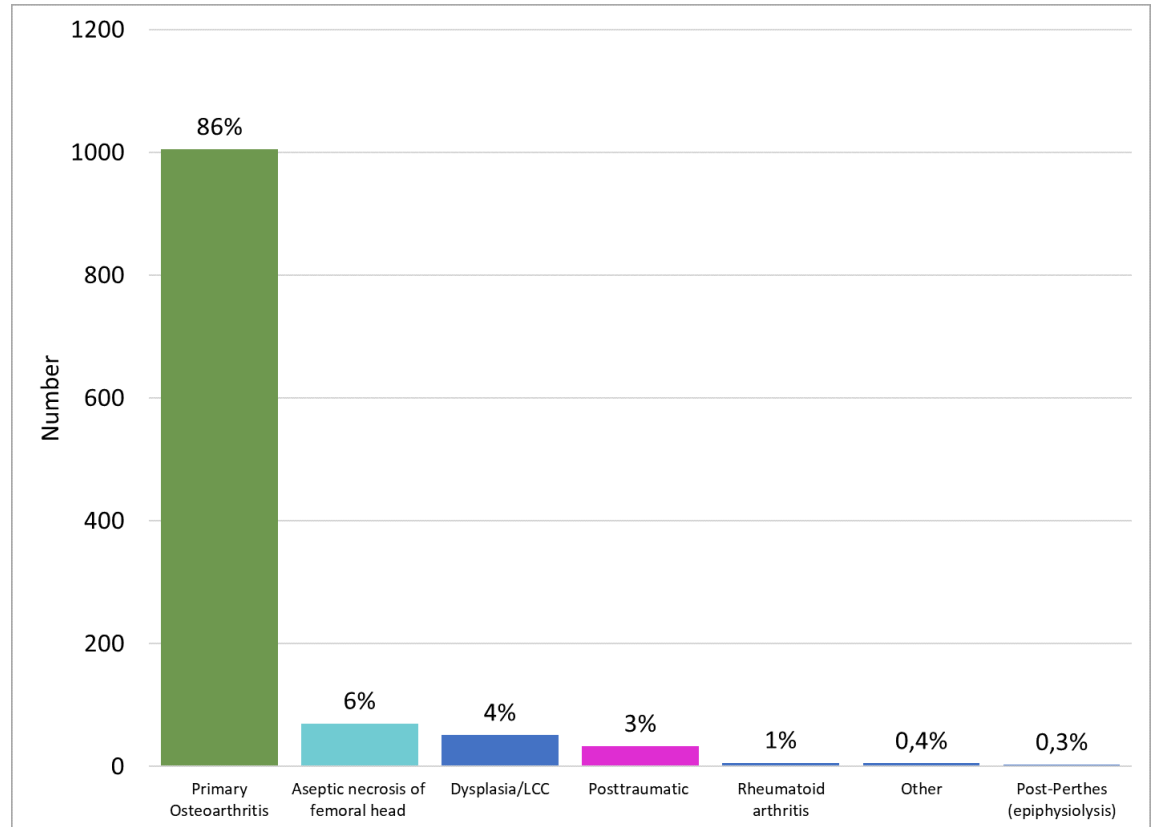


Primary total hip arthroplasty 2022

Previous procedures

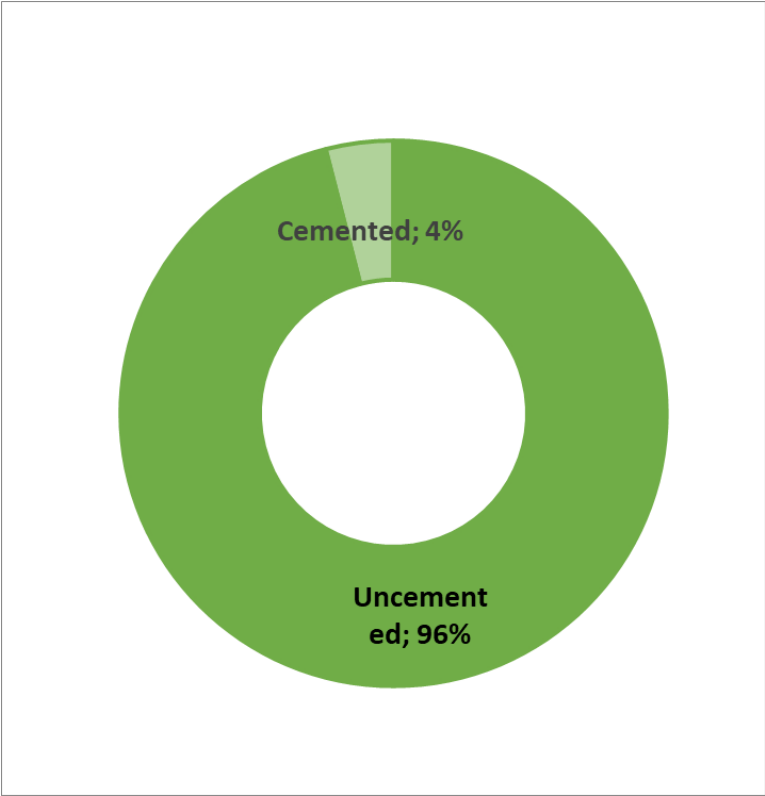
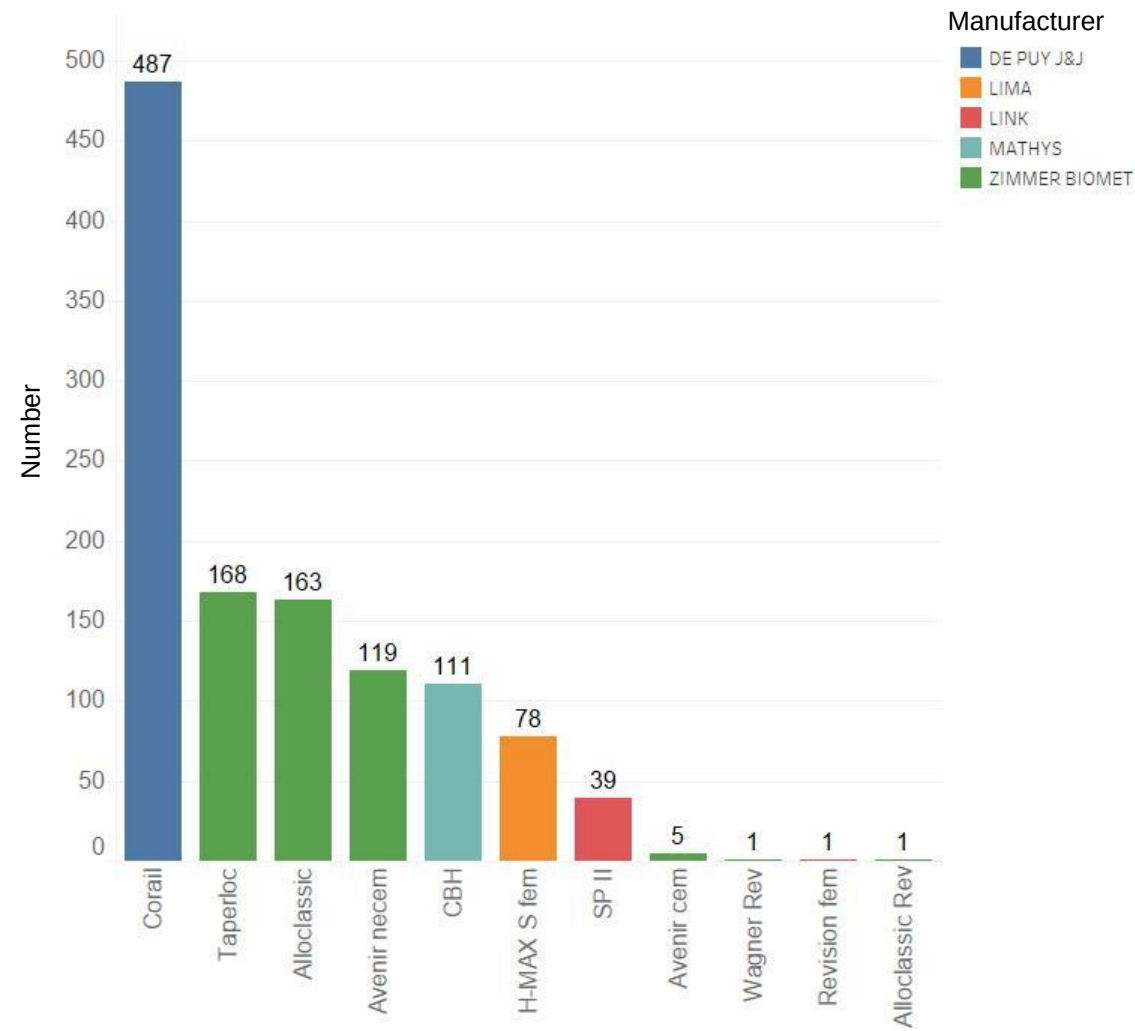


Diagnosis



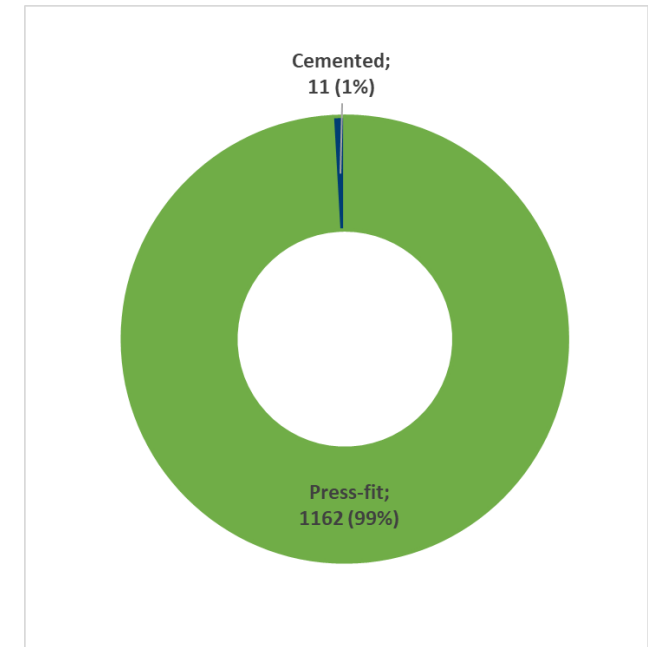
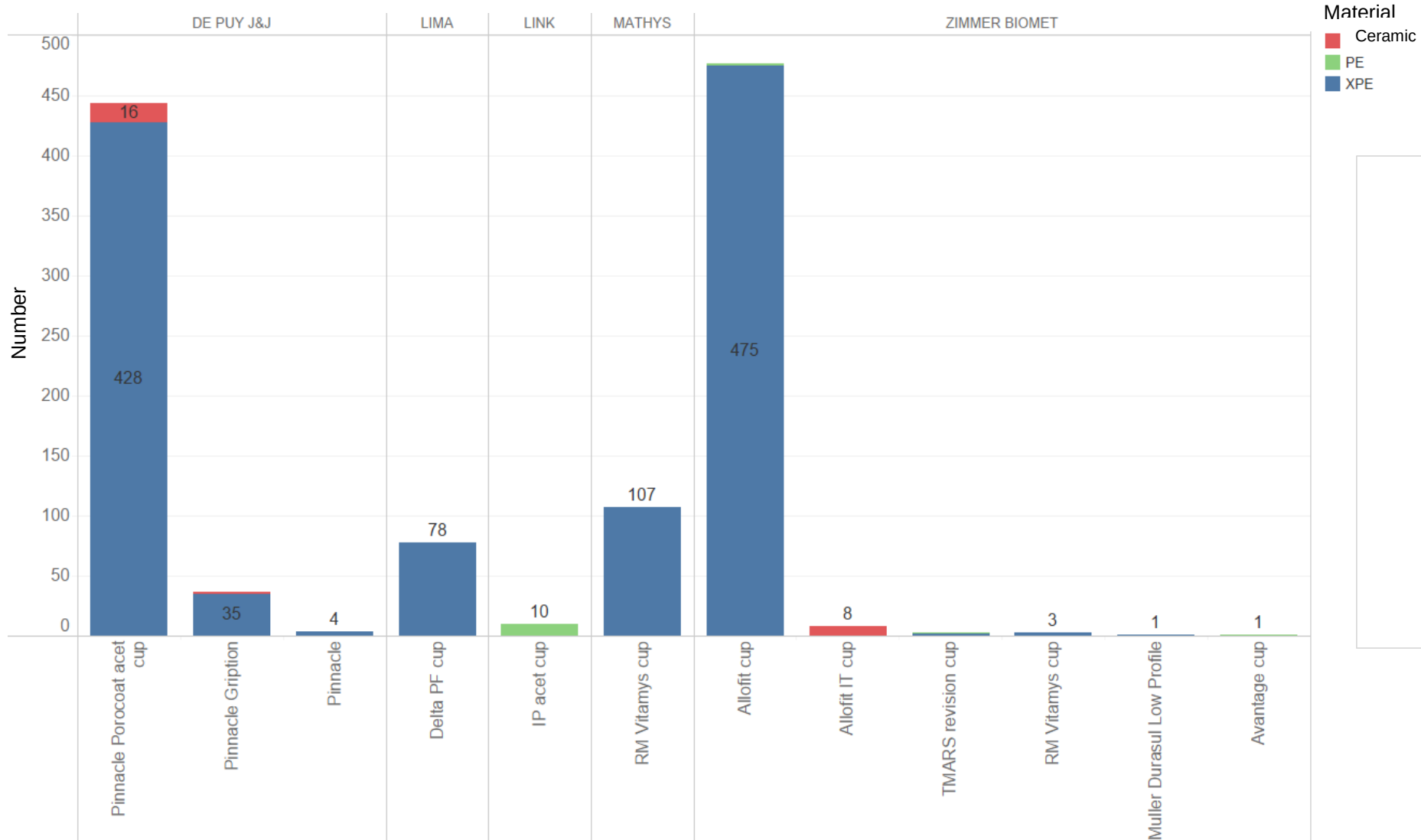
Primary total hip arthroplasty 2022

FEMORAL STEM, n=1173



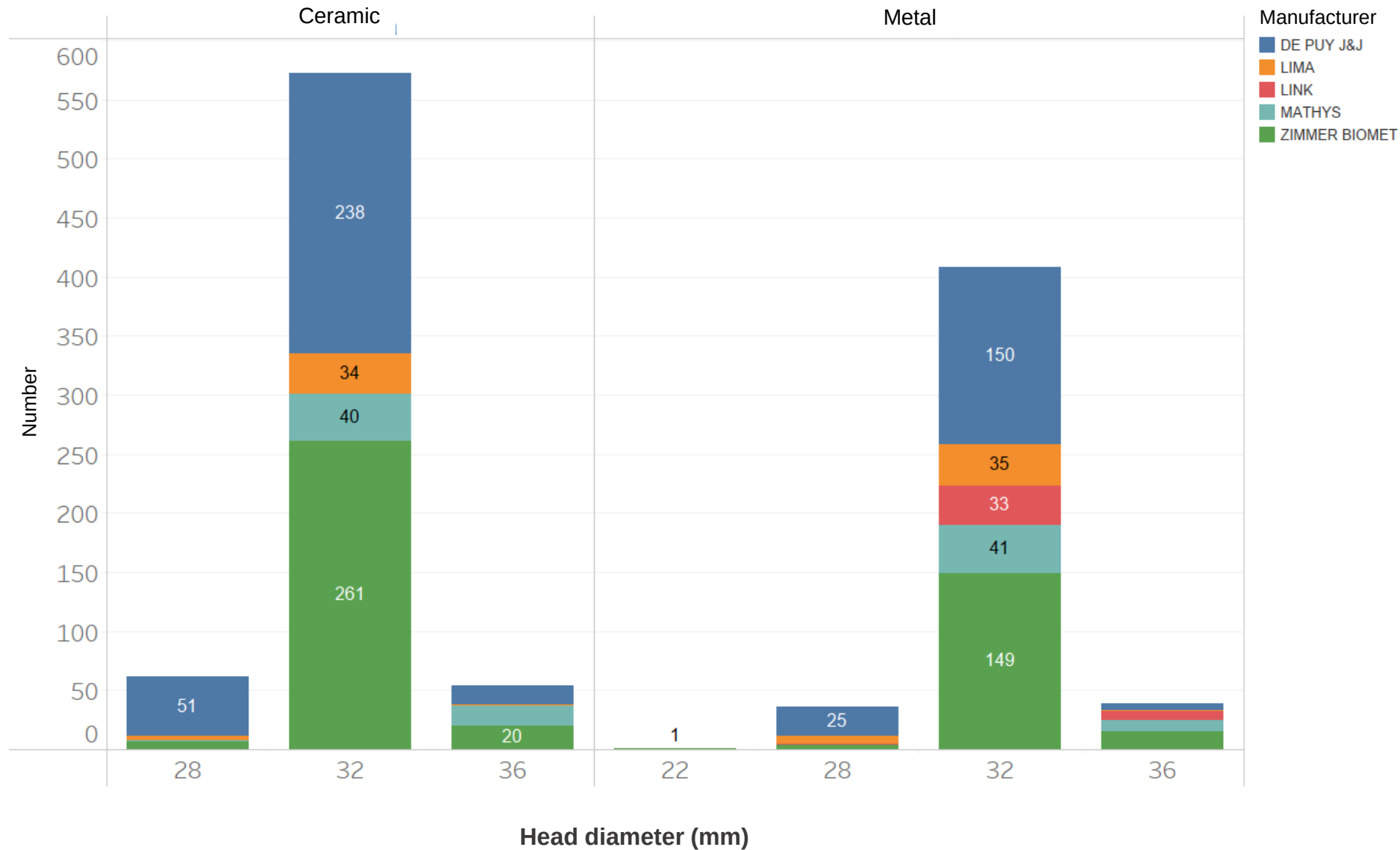
Primary total hip arthroplasty 2022

ACETABULAR PART, n=1173



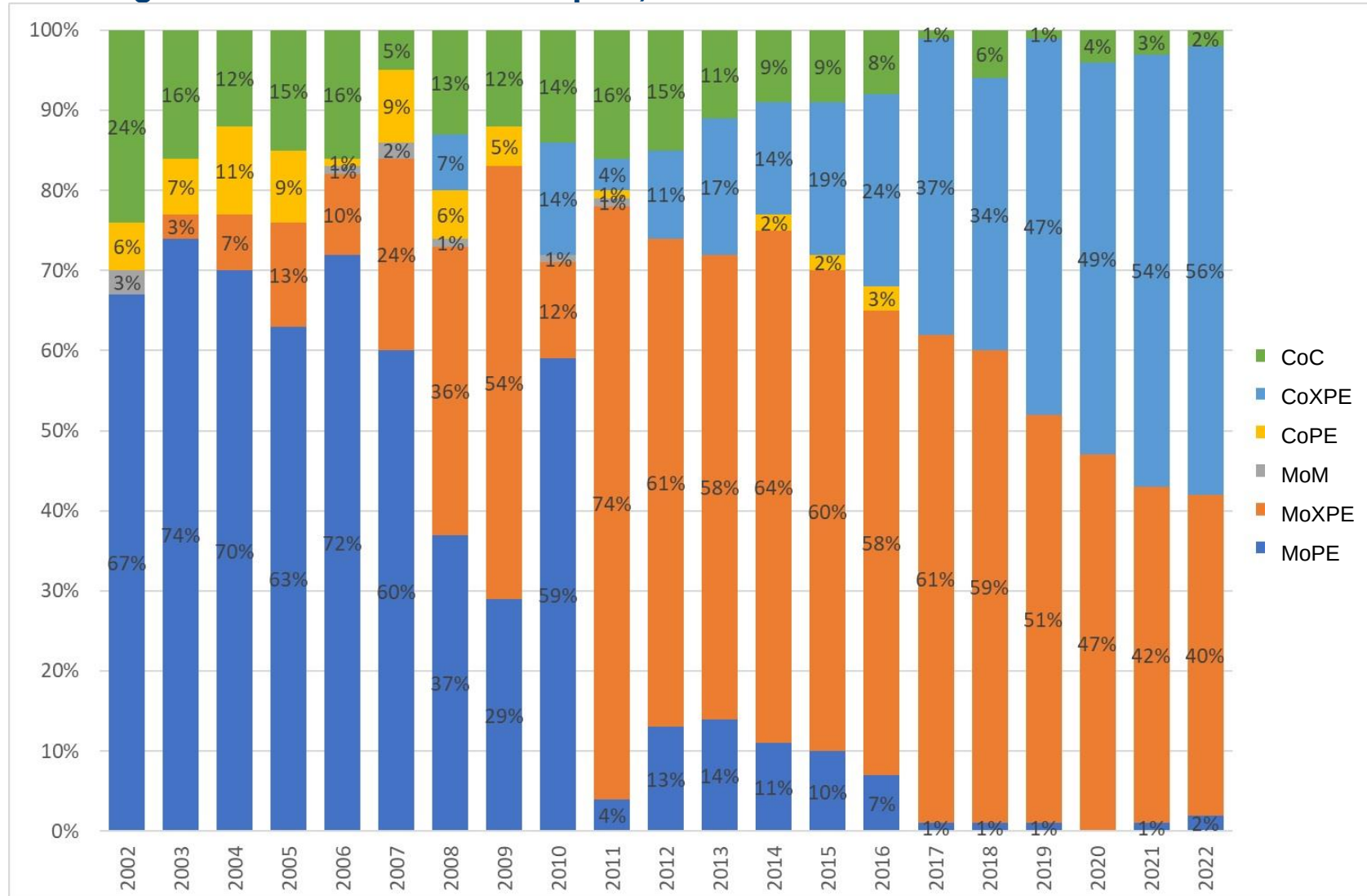
Primary total hip arthroplasty 2022

FEMORAL HEADS, n=1173



Primary total hip arthroplasty 2022

Bearing surface head/acetabular part, 2002-22

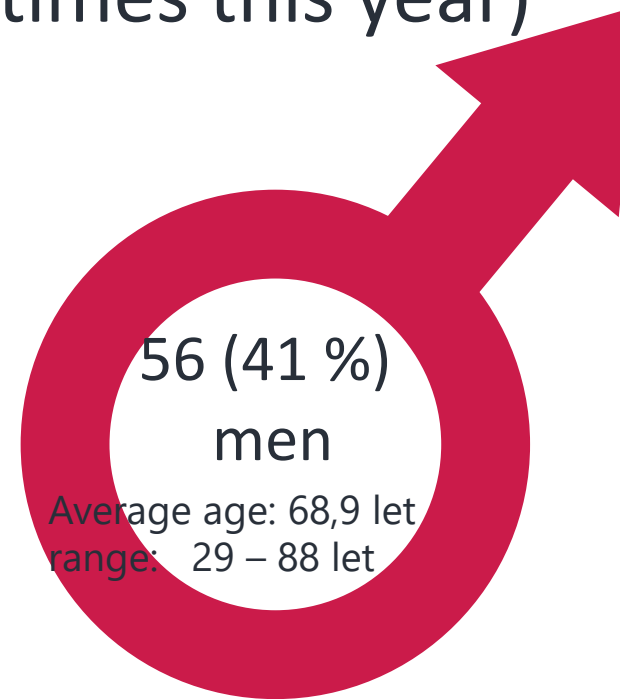
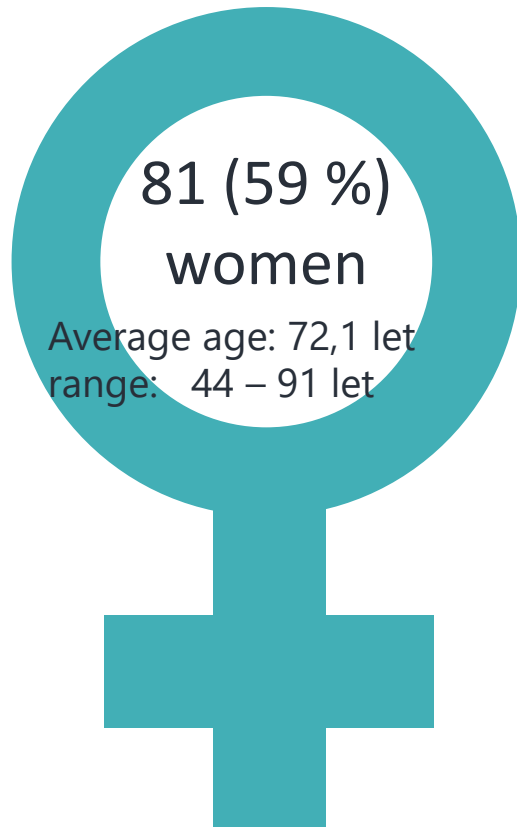


02

REVISIONS OF HIP ARTHROPLASTY 2022

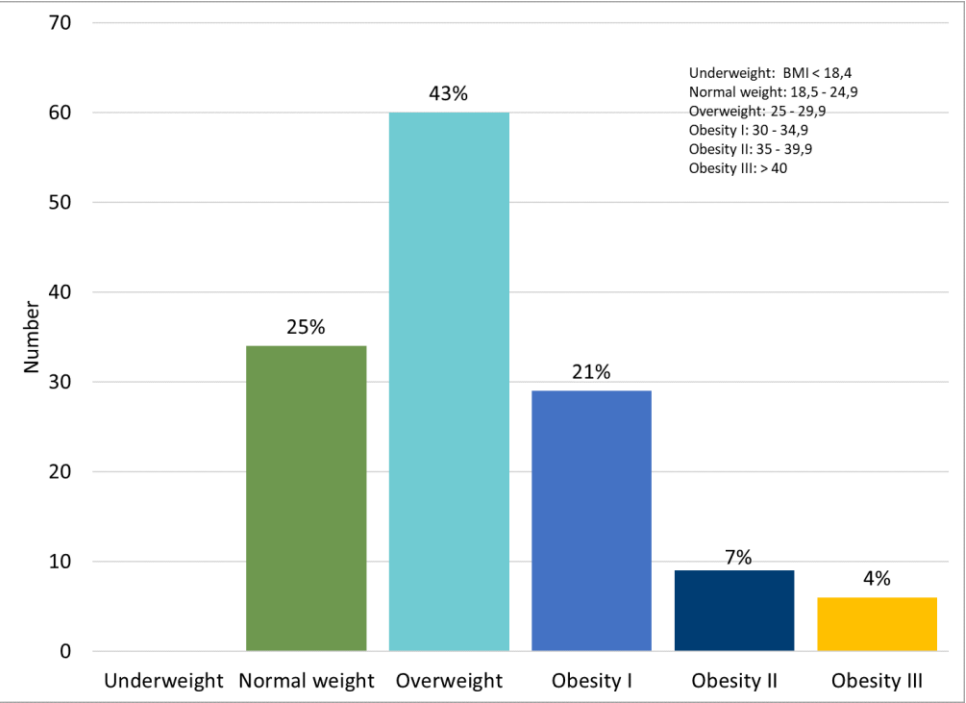
141 revision surgeries

137 patients (4 patients operated 2 times this year)



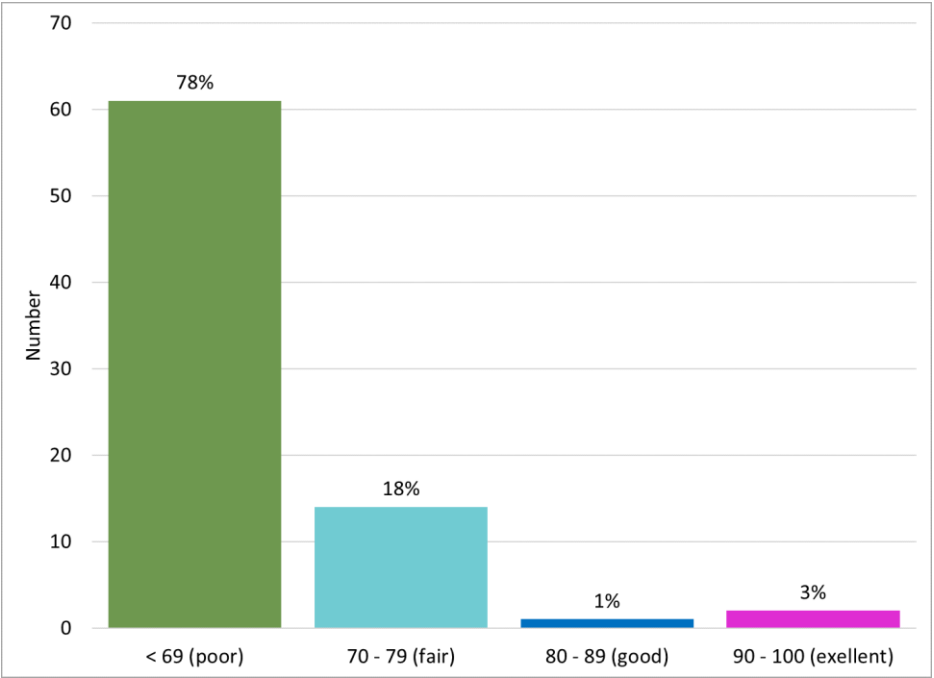
Revision hip arthroplasty 2022

BMI, average: 28.5, range: 19 - 50

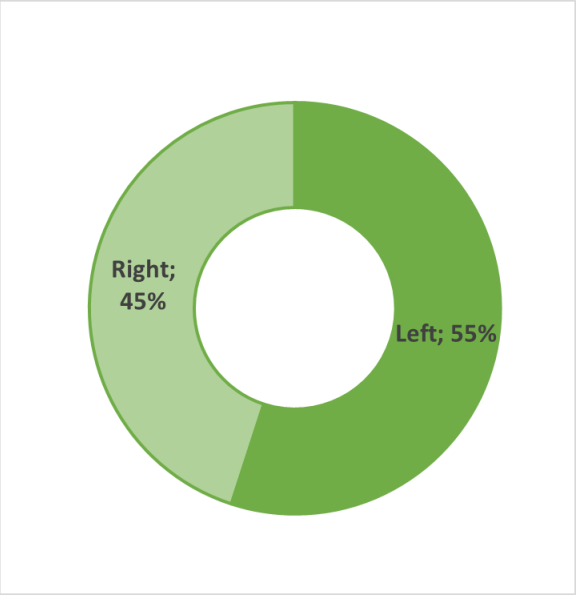


HHS preoperative*, average: 53.3, range: 11 - 93

*63 (45%) NP

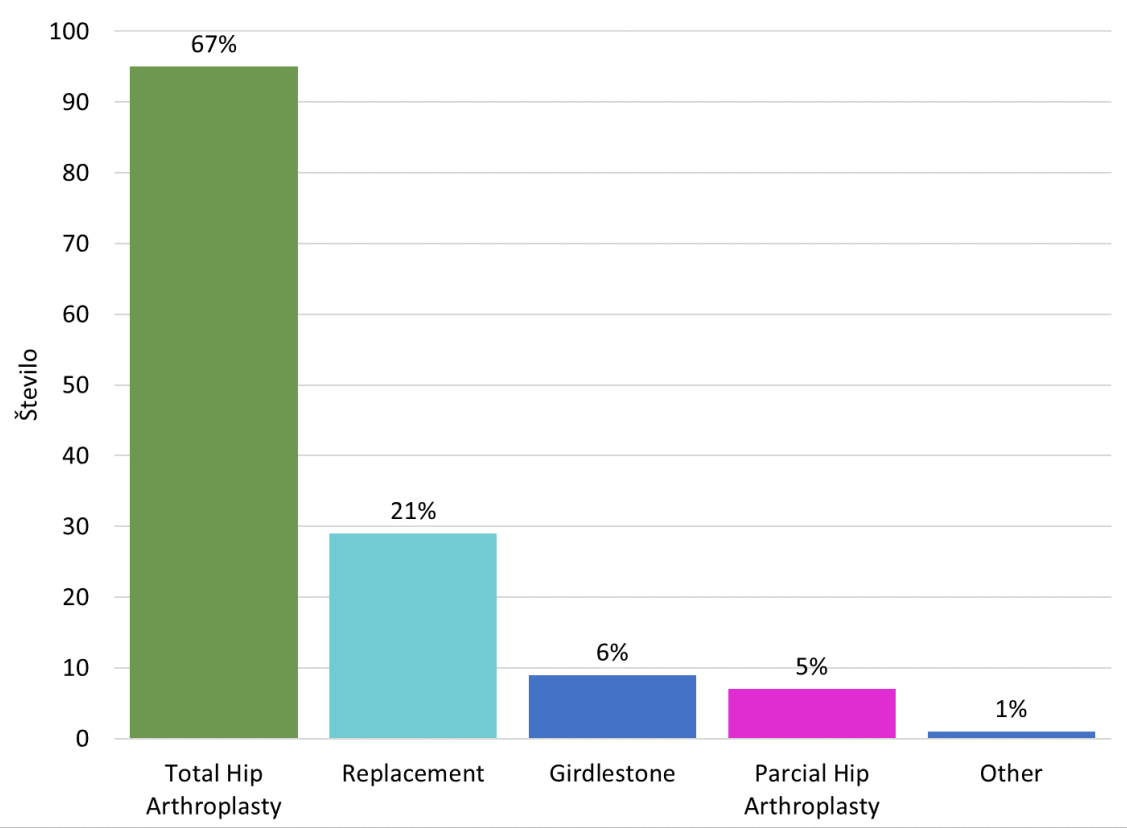


Surgery side

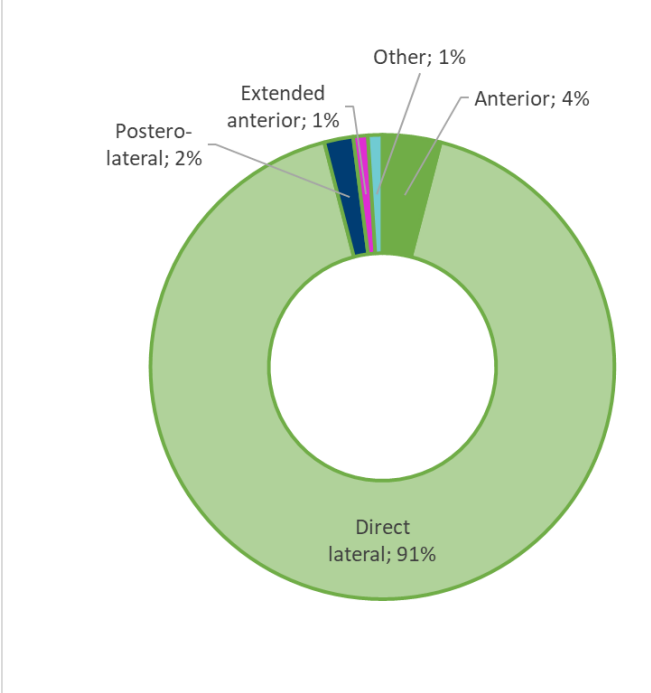


Revision hip arthroplasty 2022

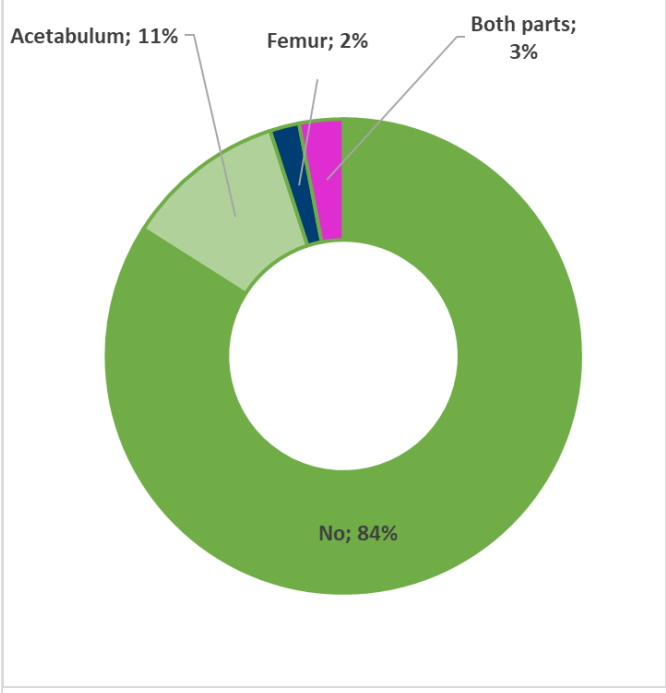
Previous procedures



Approach

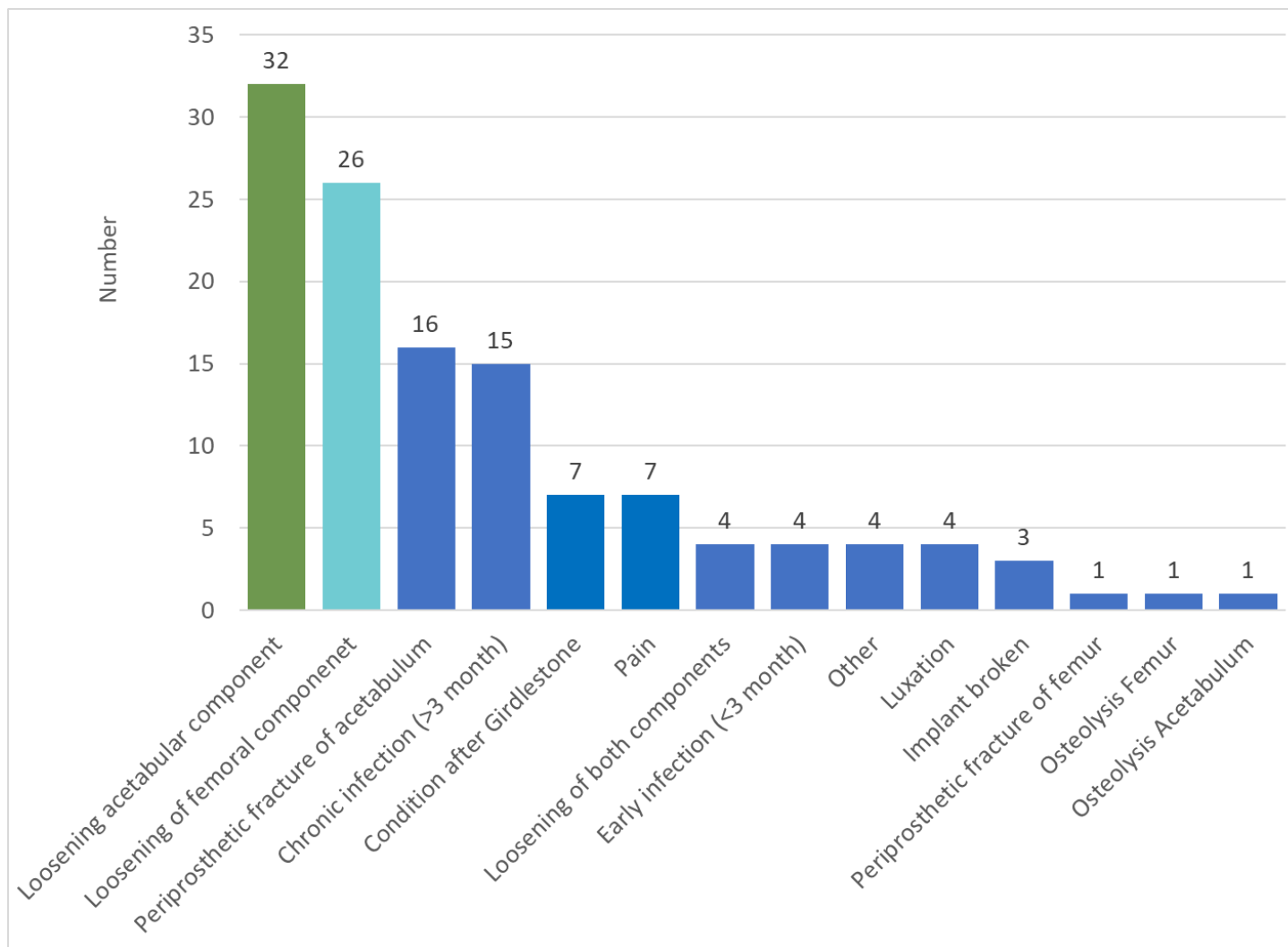


Bone transplant



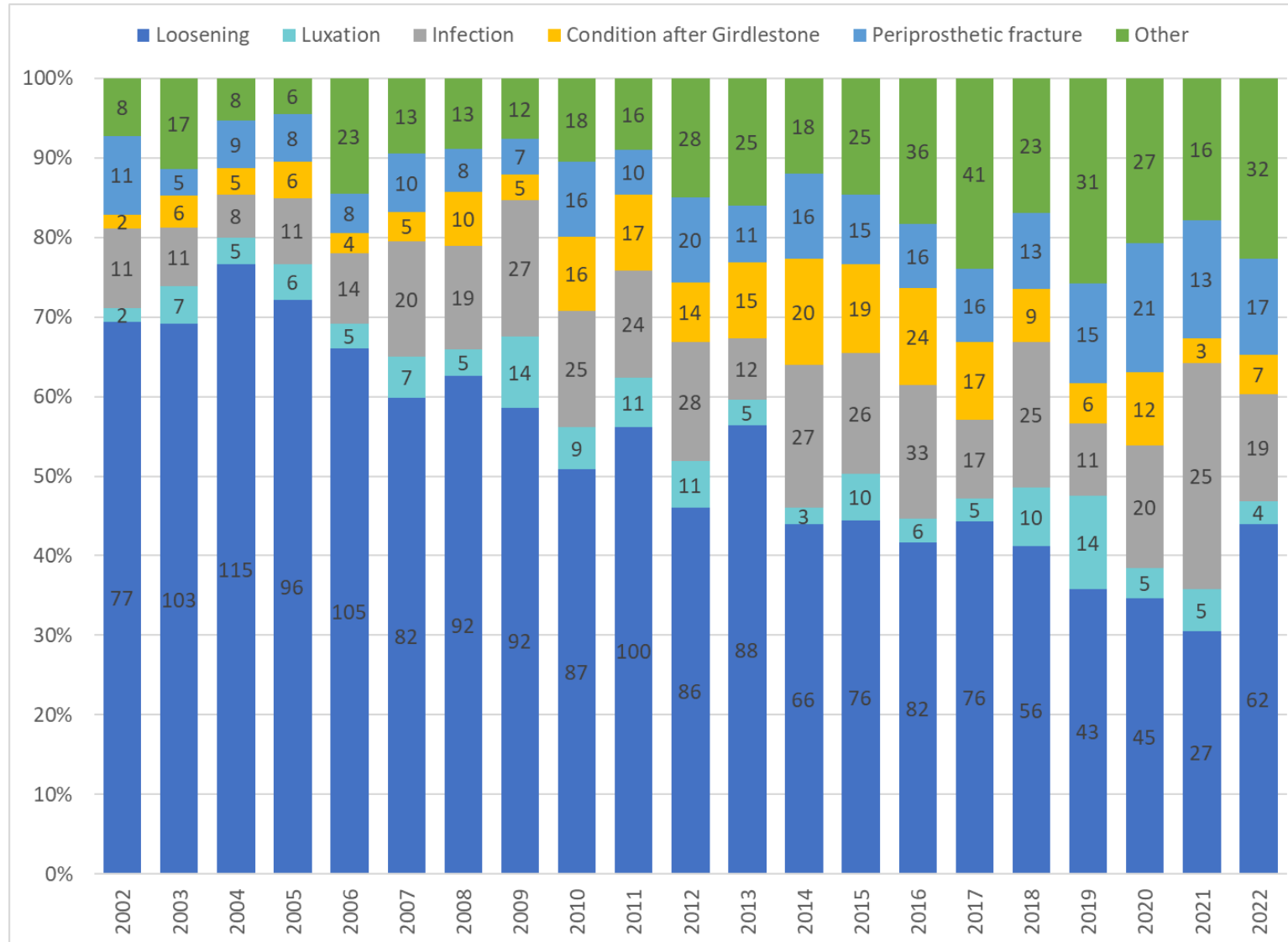
Revision hip arthroplasty 2022

Reasons for Revision



Revision hip arthroplasty 2022

Reasons for revision 2002-2022



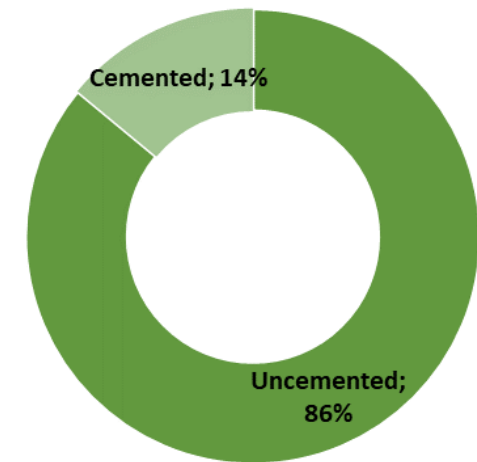
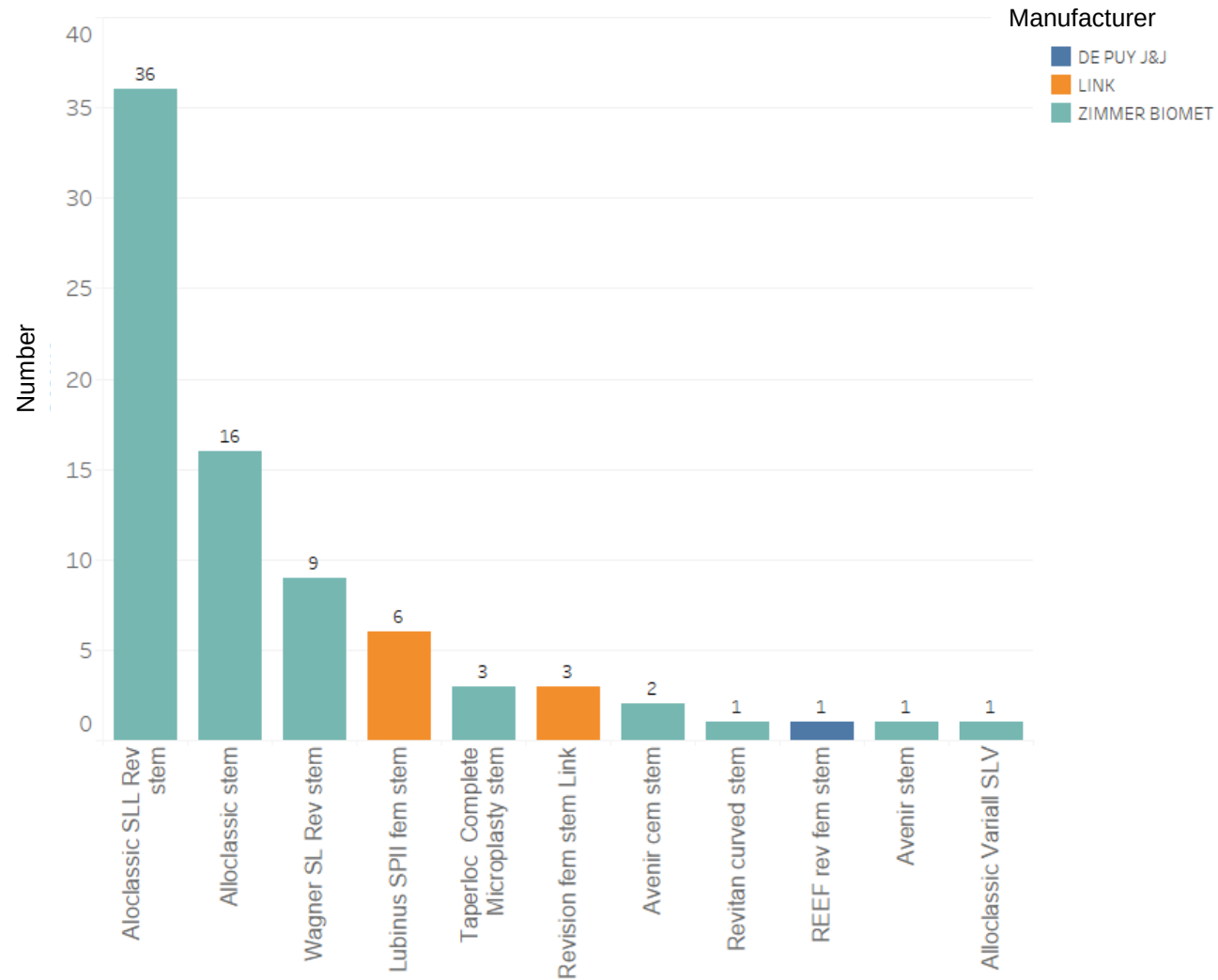
Revision hip arthroplasty 2022

Reasons for revision hips vs. Knees 2002-2022

Period 2002 - 2022	Hips (%)	Knees (%)
Loosening	52,6	20,9
Deep infection	13,3	25,6
Periprosthetic fracture	8,7	3
Condition after Girdlestone	6,7	13,1
Other	6	6,4
Luxation (dislocation)	4,8	1,6
Implant broken	3	0,9
Pain	2,5	7,8
Osteolysis	2,2	0
Metallosis	0,3	0
Instability, malposition, poor mobility	0	14,1
OA of other compartment	0	6,6

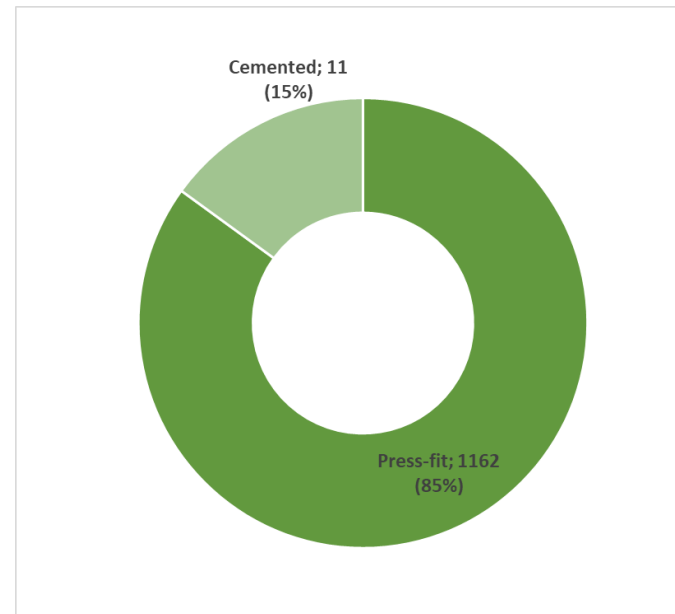
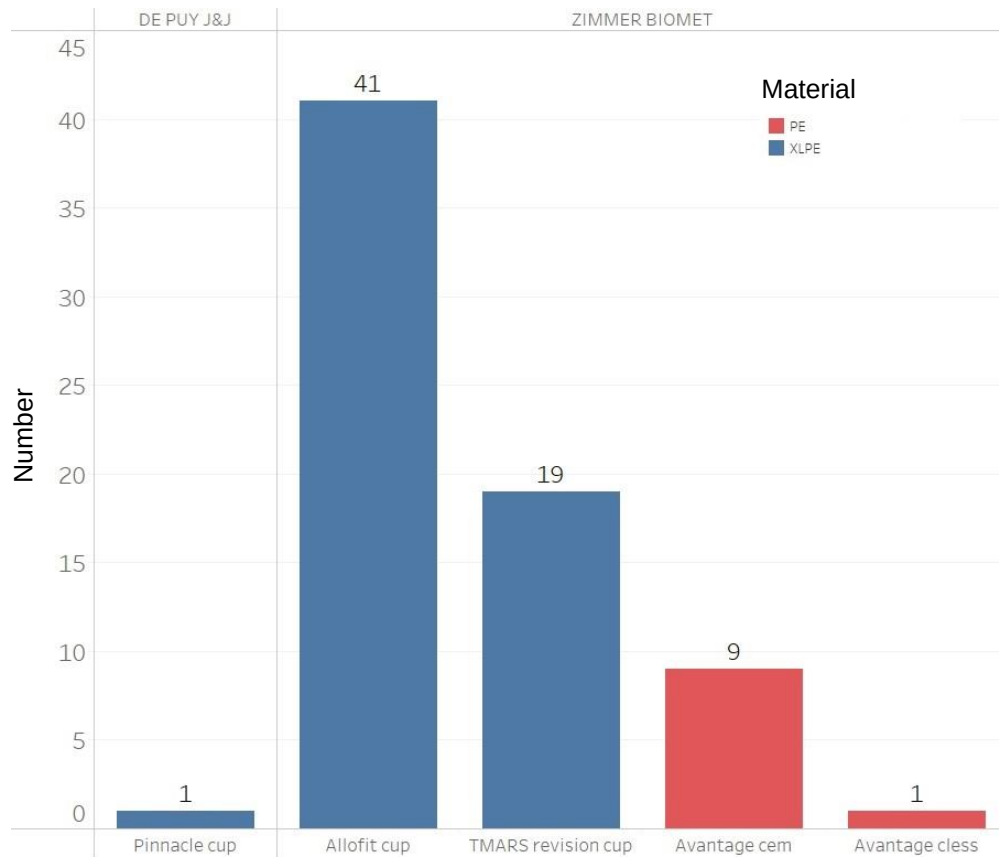
Revision hip arthroplasty 2022

Implanted femoral stems, n=79

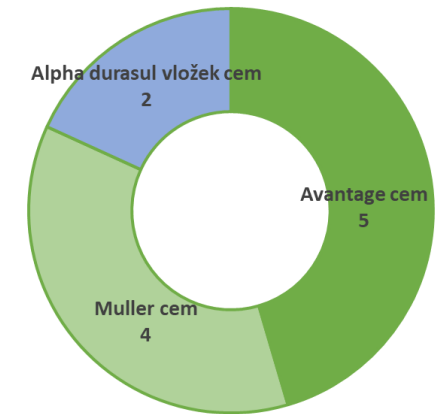


Revision hip arthroplasty 2022

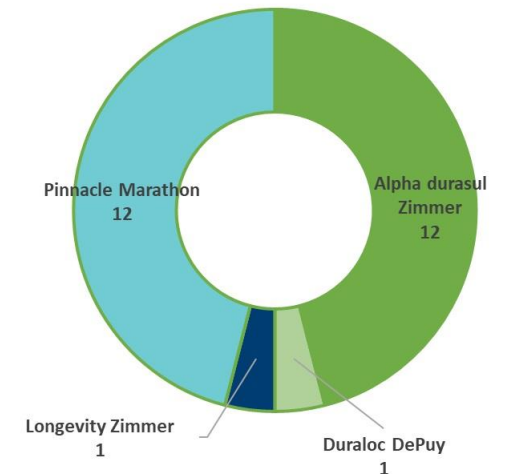
Implanted acetabular parts, n=71



Implanted acetabular rings TMARS, n=11

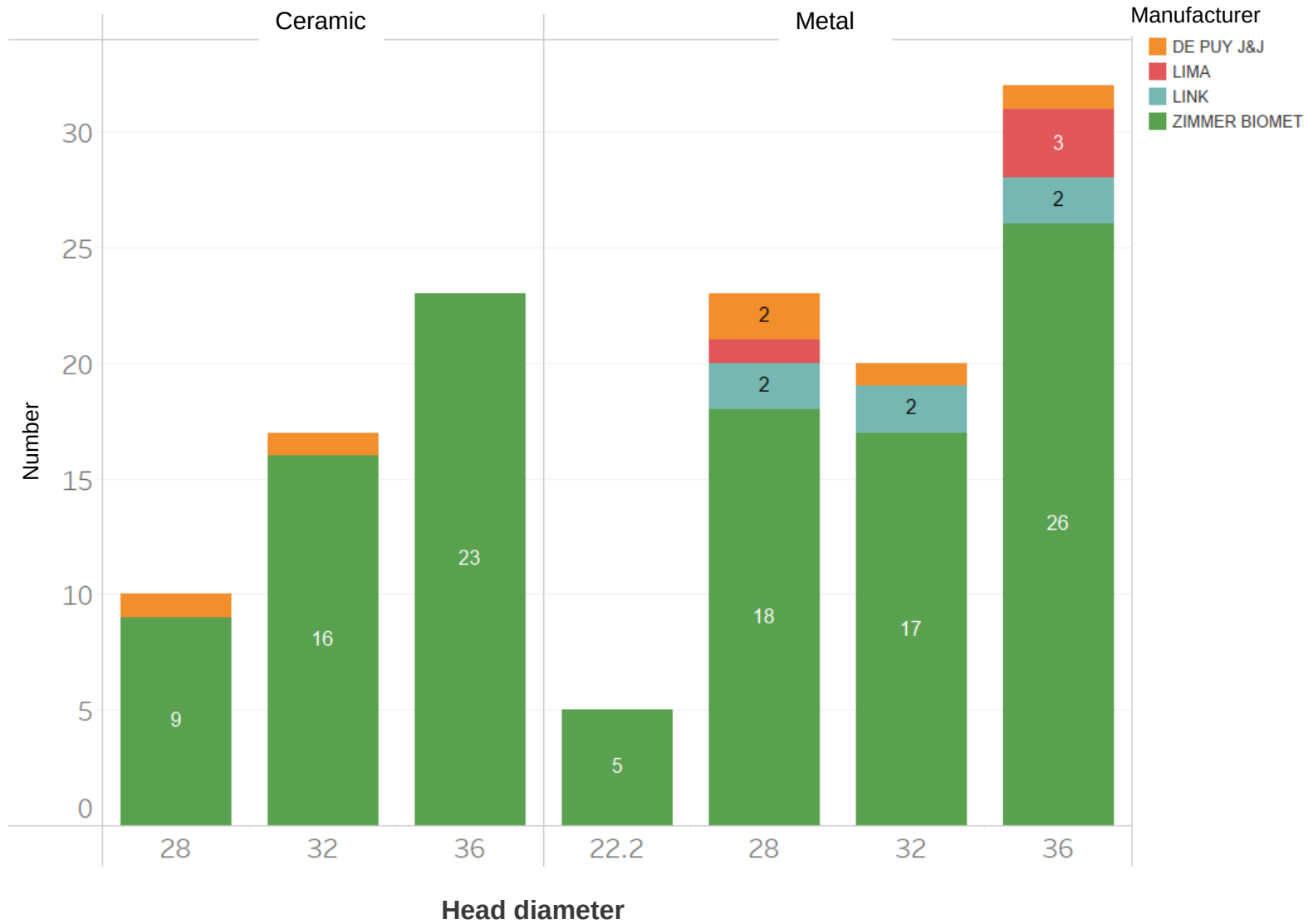


Implanted acetabular inserts only, n=26



Revision hip arthroplasty 2022

Implanted femoral heads, n=130



Revision hip arthroplasty 2022		Revision burden 2002-2022
Year	N° of revisions in OBV x 100 / (N° of primaries + N° of hip revisions in this year)	N° of revisions for ionfection in OBV x 100 / (N° of primaries + N° of hip revisions in this year)
2002	10,91	1,20
2003	12,66	0,63
2004	11,48	0,66
2005	11,14	0,67
2006	11,75	1,17
2007	11,68	1,79
2008	11,60	1,21
2009	13,59	1,79
2010	12,91	1,55
2011	13,17	1,51
2012	13,74	2,15
2013	13,06	1,01
2014	12,00	2,08
2015	12,98	1,98
2016	15,21	2,60
2017	10,09	0,91
2018	9,97	1,72
2019	8,42	0,98
2020	8,15	0,87
2021	5,61	1,64
2022	7,15	0,84
AVERAGE OBV	11,31	1,38

Revision hip arthroplasty 2022

Survival table – cumulative percent of revision of femoral stems in the period 2002-22, new – used in the last 5 years

Femoral stem*	N°of primaries	N°of first revisions	Age	% of women	Time from primary implantation			
			Median (IQR)		1 yr	5 yr	10 yr	15 yr
Alloclassic - ZIMMER BIOMET	6494	86	67 (60-74)	54	0.65 (0.48 - 0.88)	1.06 (0.83 - 1.35)	1.57 (1.24 - 2.00)	2.51 (1.81 - 3.49)
Avenir cless -ZIMMER BIOMET	235	4	68 (60-75)	67	1.74 (0.66 - 4.56)			
CBH cless - MATHYS	661	18	69 (61-75)	53	0.65 (0.24 - 1.71)	2.18 (1.2 - 3.94)	4.44 (2.68 - 7.33)	
Corail - DePuy J&J	3080	23	65 (57-72)	50	0.30 (0.16 - 0.58)	0.61 (0.36 - 1.03)	1.25 (0.71 - 2.19)	2.33 (1.33 - 4.08)
Fitmore - ZIMMER BIOMET	190	6	65 (58-72)	39	2.11 (0.8 - 5.51)	2.64 (1.11 - 6.22)	3.42 (1.53 - 7.55)	
H MAX cless - LIMA	499	4	71 (64-77)	58	0.60 (0.19 - 1.85)	1.07 (0.37 - 3.09)	1.07 (0.37 - 3.09)	
SP II - LINK	820	6	79 (75-83)	79	0.26 (0.06 - 1.03)	0.56 (0.21 - 1.51)	0.76 (0.31 - 1.84)	0.76 (0.31 - 1.84)
Taperloc Complete Microplasty - ZIMMER BIOMET	824	4	66 (58-72)	54	0.51 (0.19 - 1.34)	0.51 (0.19 - 1.34)		
Tri-Lock - DePuy J&J	233	5	66 (58-73)	46	0	2.26 (0.94 - 5.34)		

Only femoral stems, where the N° of implanted was at least 20
IQR-Interquartile range

Revision hip arthroplasty 2022

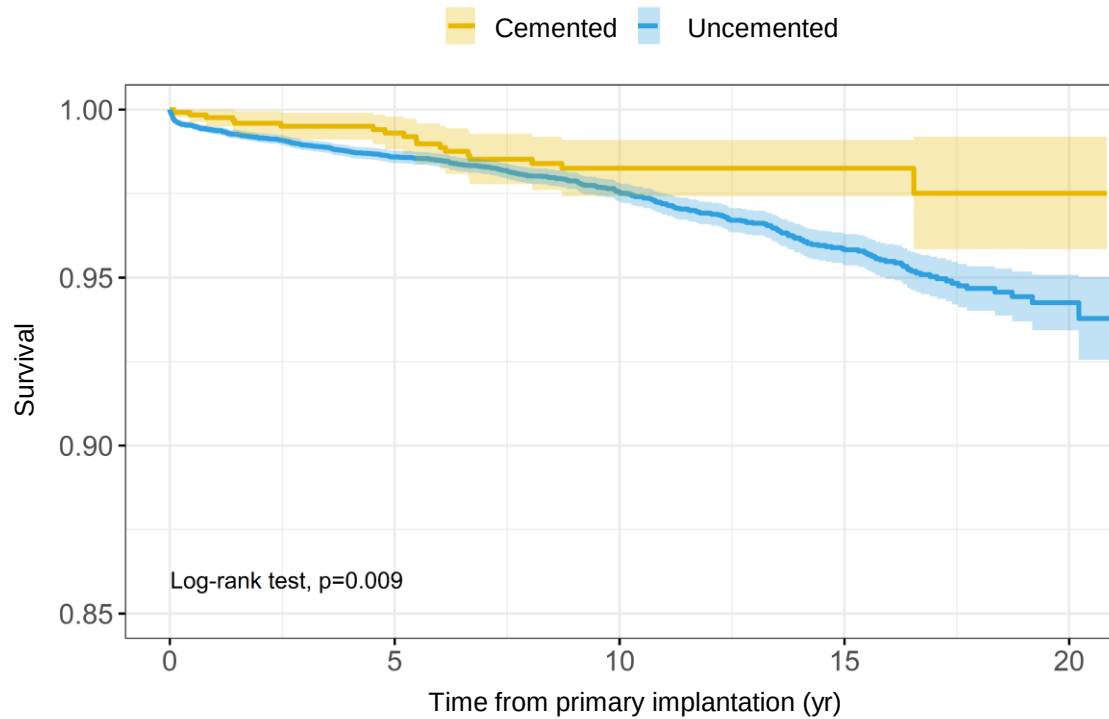
Survival table – cumulative percent of revision of femoral stems in the period 2002-22, older then 5 years

Femoral stem*	N°of primaries	N°of first revisions	Age	% of women	Time from primary implantation			
			Median (IQR)		1 yr	5 yr	10 yr	15 yr
AHS - WRIGHT	85	2	80 (77-83)	77	0	1.37 (0.19 - 9.33)	2.91 (0.73 - 11.17)	2.91 (0.73 - 11.17)
Alto - ZIMMER BIOMET	113	0	77 (75-79)	89	0	0	0	0
Anca - WRIGHT	33	2	50 (44-53)	67	0	3.03 (0.43 - 19.63)	3.03 (0.43 - 19.63)	3.03 (0.43 - 19.63)
Basis CL - S&N	43	3	80 (79-83)	74	0	0	10.63 (3.52 - 29.66)	10.63 (3.52 - 29.66)
C2 - LIMA	277	9	65 (56-73)	56	0.36 (0.05 - 2.54)	1.83 (0.76 - 4.33)	3.02 (1.52 - 5.96)	
Conserve - WRIGHT	44	0	53 (51-55)	2	0	0	0	0
Unibionix COPF - UNIOR (CHENDO)	127	6	66 (61-71)	35	0.79 (0.11 - 5.46)	4.86 (2.21 - 10.51)	4.86 (2.21 - 10.51)	4.86 (2.21 - 10.51)
Elite plus - DePuy J&J	78	2	77 (74-79)	82	0	0	3.31 (0.84 - 12.6)	3.31 (0.84 - 12.6)
Exception - ZIMMER BIOMET	171	4	68 (61-74)	57	0.58 (0.08 - 4.08)	1.18 (0.3 - 4.64)	2.47 (0.93 - 6.45)	
Metabloc cem - ZIMMER BIOMET	24	2	80 (76-82)	83	4.17 (0.60 - 26.08)	8.96 (2.31 - 31.45)	8.96 (2.31 - 31.45)	
CFP - LINK	69	3	67 (59-70)	35	1.45 (0.21 - 9.84)	4.35 (1.42 - 12.88)	4.35 (1.42 - 12.88)	4.35 (1.42 - 12.88)
Profemur Z - WRIGHT	1100	77	63 (55-70)	57	1.37 (0.83 - 2.26)	2.76 (1.94 - 3.92)	4.73 (3.61 - 6.20)	7.31 (5.73 - 9.29)
Ribbed - LINK	131	6	60 (55-65)	57	0	1.54 (0.39 - 6.01)	4.68 (2.13 - 10.13)	4.68 (2.13 - 10.13)
Taperloc cless - ZIMMER BIOMET	66	0	72 (64-75)	68	0	0	0	0
Versys - ZIMMER BIOMET	1015	37	68 (60-73)	59	0.49 (0.21 - 1.19)	1.52 (0.92 - 2.51)	2.77 (1.89 - 4.05)	3.59 (2.55 - 5.06)
Versys FM - ZIMMER BIOMET	68	1	63 (54-70)	52	0	0	1.69 (0.24 - 11.43)	1.69 (0.24 - 11.43)
SL-PLUS - S&N	2659	134	68 (60-73)	61	0.57 (0.34 - 0.94)	1.77 (1.33 - 2.36)	3.07 (2.46 - 3.83)	5.81 (4.87 - 6.92)

Only femoral stems, where the N° of implanted was at least 20
IQR-Interquartile range

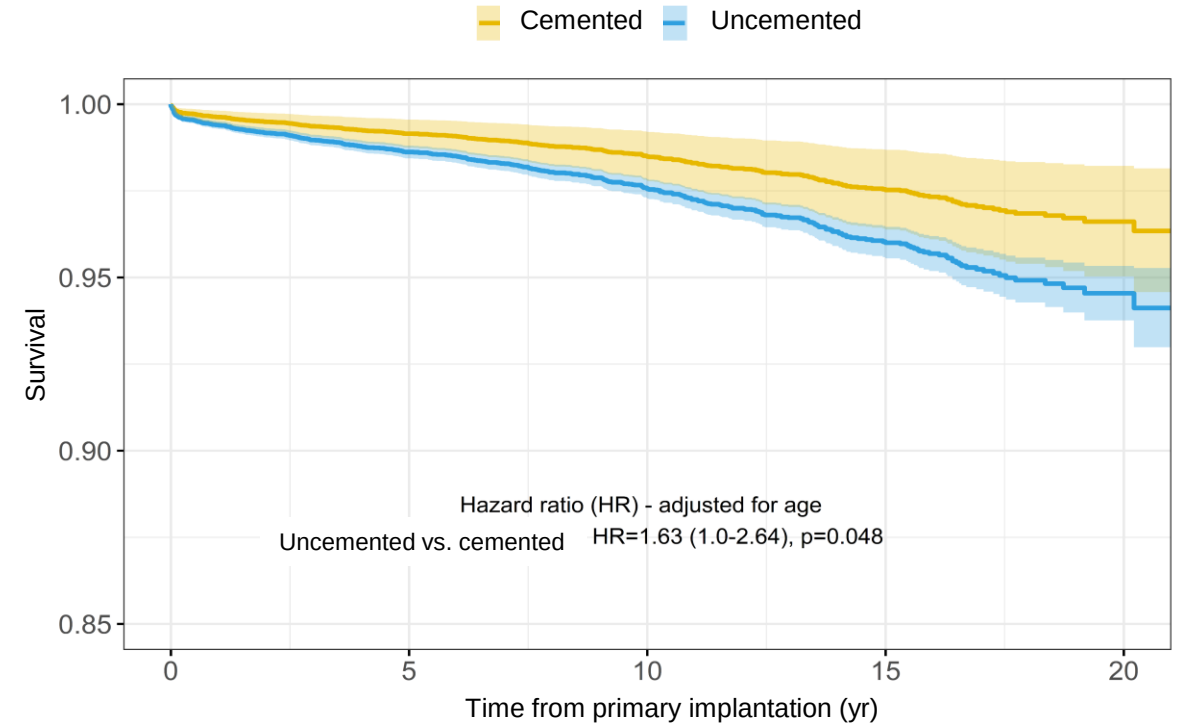
Revision hip arthroplasty 2022

Survival of femoral stems



Number at risk

Cementirani	1302	955	594	226	12
Necementirani	18044	12029	7003	2868	245



Revision hip arthroplasty 2022

Survival table – cumulative percent of revision of acetabular parts in the period 2002-22, new – used in the last 5 years

Acetabular part*	N°of primaries	N°of first revisions	Age	% of women	Time from primary implantation				
			Median (IQR)		1 yr	5 yr	10 yr	15 yr	
Allofit - ZIMMER BIOMET	8452	86	68 (60 - 74)	56	0.56 (0.42 - 0.74)	0.93 (0.73 - 1.17)	1.25 (1.00 - 1.56)	1.45 (1.09 - 1.94)	
Allofit IT- ZIMMER BIOMET	276	0	52 (45 - 60)	41	0	0	0		
Delta PF - LIMA	759	10	69 (60 - 76)	57	0.56 (0.21 - 1.47)	0.75 (0.31 - 1.80)	2.14 (1.05 - 4.34)		
Muller Durasul - ZIMMER BIOMET	91	5	77 (68 - 81)	75	4.47 (1.70 - 11.48)	4.47 (1.70 - 11.48)	7.46 (2.84 - 18.82)	7.46 (2.84 - 18.82)	
IP - LINK	364	3	80 (77 - 83)	80	0.28 (0.04 - 1.98)	0.89 (0.29 - 2.74)	0.89 (0.29 - 2.74)	0.89 (0.29 - 2.74)	
Pinnacle - DePuy J&J	3059	11			0.07 (0.02 - 0.28)	0.43 (0.22 - 0.84)	0.65 (0.29 - 1.44)	1.01 (0.43 - 2.39)	
Muller cem - LIMA	338	22	78 (73 - 81)	77	0.31 (0.04 - 2.15)	1.36 (0.51 - 3.59)	4.80 (2.73 - 8.36)	9.17 (5.49 - 15.11)	
RM Pressfit - MATHYS	279	12	73 (66 - 79)	68	0.36 (0.05 - 2.53)	1.86 (0.78 - 4.4)	4.91 (2.71 - 8.79)	5.77 (3.23 - 10.20)	
RM Vitamys - MATHYS	222	1	68 (60 - 77)	49	0.46 (0.06 - 3.2)	0.46 (0.06 - 3.2)			

Only femoral stems, where the N° of implanted was at least 20
IQR-Interquartile range

Revision hip arthroplasty 2022

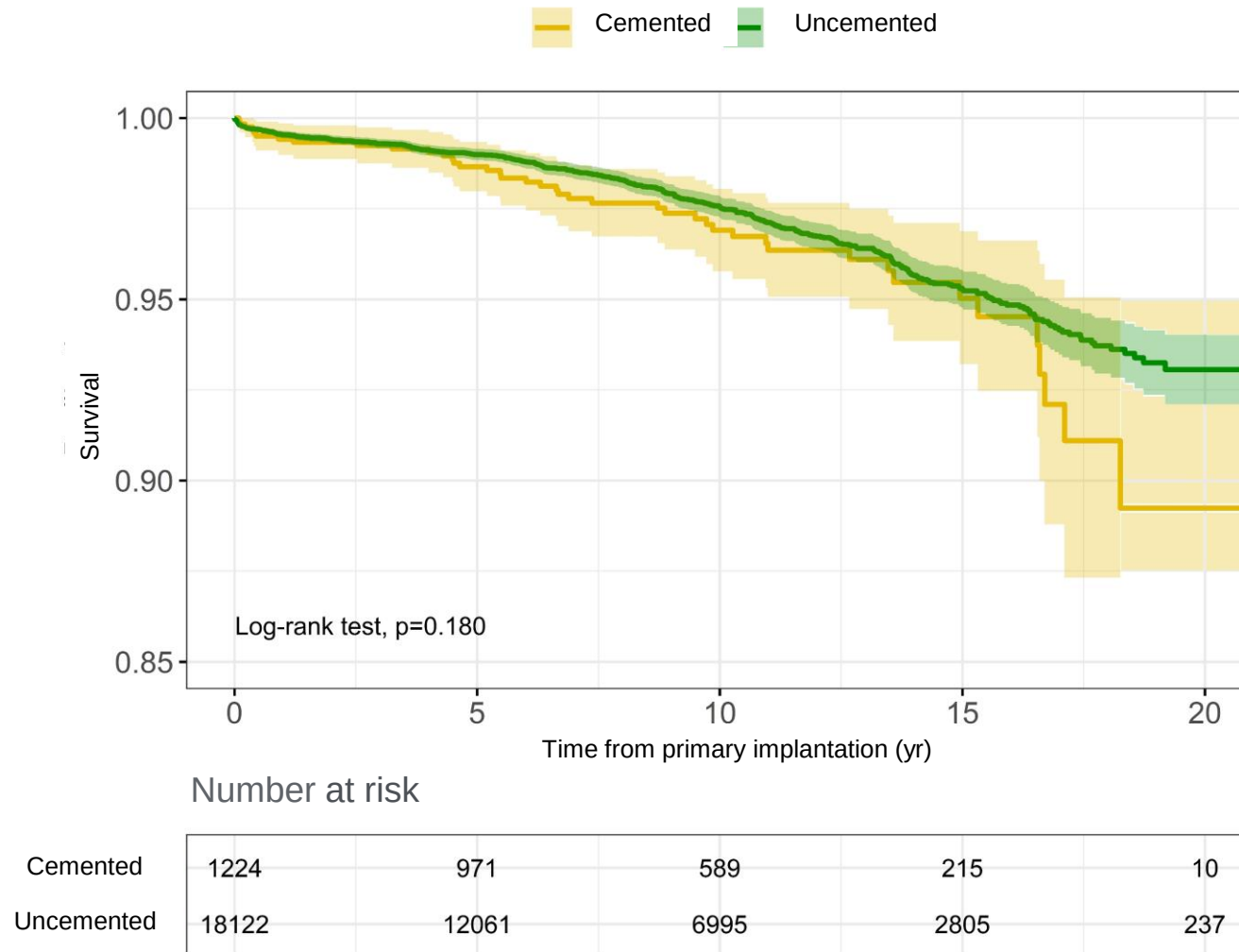
Survival table – cumulative percent of revision of acetabular parts in the period 2002-22, older then 5 years

Acetabular part*	N°of primaries	N°of first revisions	Age	% of women	Time from primary implantation				
			Median (IQR)		1 yr	5 yr	10 yr	15 yr	
Anca - WRIGHT	53	1	53 (48 - 61)	45	0	1.89 (0.27 - 12.65)	1.89 (0.27 - 12.65)	1.89 (0.27 - 12.65)	
Apollo - BIOMET	173	6	76 (74 - 79)	82	0	1.29 (0.32 - 5.05)	2.82 (1.06 - 7.4)	3.95 (1.62 - 9.46)	
Conserve - WRIGHT	47	0	53 (50 - 55)	4	0	0	0	0	
Duraloc - DePuy J&J	396	12	67 (59 - 72)	59	0.25 (0.04 - 1.78)	0.78 (0.25 - 2.39)	1.67 (0.75 - 3.68)	3.65 (2.08 - 6.38)	
EHS E - WRIGHT	318	45	63 (55 - 69)	52	0	1.60 (0.67 - 3.81)	8.74 (6.03 - 12.58)	14.19 (10.59 - 18.87)	
Exceed ABT - ZIMMER BIOMET	157	1	68 (61 - 74)	59	0.64 (0.09 - 4.43)	0.64 (0.09 - 4.43)	0.64 (0.09 - 4.43)		
G7 - ZIMMER BIOMET	57	0	66 (54 - 75)	46	0	0			
Mallory - ZIMMER BIOMET	51	1	72 (63 - 76)	63	0	1.96 (0.28 - 13.11)	1.96 (0.28 - 13.11)		
CFP - LINK	434	30	67 (62 - 71)	62	0.46 (0.12 - 1.84)	1.89 (0.95 - 3.74)	4.27 (2.67 - 6.78)	7.13 (4.89 - 10.35)	
Muller II - S&N	42	3	80 (79 - 83)	79	0	0	10.74 (3.56 - 29.92)	10.74 (3.56 - 29.92)	
Doets - S&N	519	83	70 (66 - 74)	58	0.58 (0.19 - 1.8)	2.40 (1.37 - 4.19)	10.37 (7.89 - 13.58)	18.54 (15.01 - 22.78)	
Isoel - MATHYS	63	6	64 (54 - 75)	71	1.59 (0.23 - 10.74)	4.87 (1.6 - 14.34)	6.81 (2.60 - 17.21)	11.85 (5.39 - 24.95)	
MPF - S&N	212	15	69 (62 - 74)	68	1.42 (0.46 - 4.32)	1.92 (0.72 - 5.02)	5.23 (2.84 - 9.52)	9.49 (5.59 - 15.87)	
Muller - ZIMMER BIOMET	27	0	80 (78 - 82)	96	0	0	0		
Procotyl - WRIGHT	146	2	56 (49 - 63)	35	1.37 (0.34 - 5.37)	1.37 (0.34 - 5.37)	1.37 (0.34 - 5.37)		
Selexys PC - MATHYS	53	0	64 (54 - 74)	23	0	0			
Selexys TPS - MATHYS	75	0	66 (60 - 73)	52	0	0	0		
SPH - LIMA	45	2	59 (52 - 61)	62	2.22 (0.32 - 14.75)	4.50 (1.14 - 16.81)	4.50 (1.14 - 16.81)	4.50 (1.14 - 16.81)	
Cem - SURGIVAL	103	2	77 (73 - 80)	77	0.99 (0.14 - 6.82)	2.08 (0.52 - 8.07)	2.08 (0.52 - 8.07)	2.08 (0.52 - 8.07)	
Triology AB - ZIMMER BIOMET	325	21	57 (49 - 62)	44	0.62 (0.15 - 2.44)	1.86 (0.84 - 4.08)	3.14 (1.7 - 5.75)	6.57 (4.28 - 10.01)	
Triology - ZIMMER BIOMET	1416	41	68 (62 - 73)	56	0.28 (0.11 - 0.75)	0.43 (0.19 - 0.96)	1.50 (0.96 - 2.34)	2.96 (2.11 - 4.17)	
Ultima - DePuy J&J	61	1	77 (74 - 80)	82	0	0	0	3.33 (0.48 - 21.39)	
Bicon - S&N	650	57	66 (57 - 72)	69	0.92 (0.42 - 2.05)	2.19 (1.30 - 3.67)	5.14 (3.64 - 7.23)	8.61 (6.54 - 11.29)	

Only femoral stems, where the N° of implanted was at least 20
IQR-Interquartile range

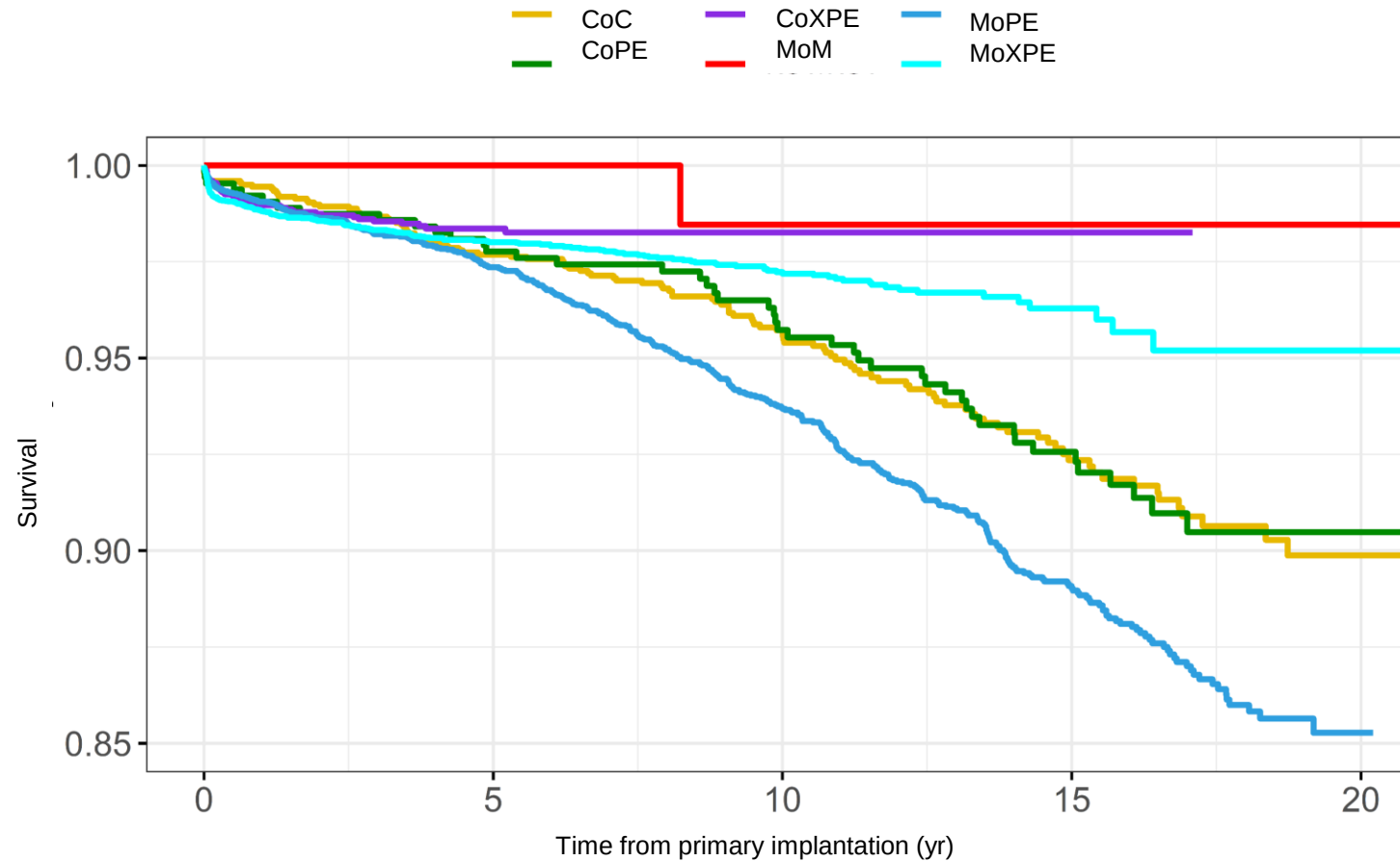
Revision hip arthroplasty 2022

Acetabular parts by fixation – survival curve



Revision hip arthroplasty 2022

Bearings – survival curve

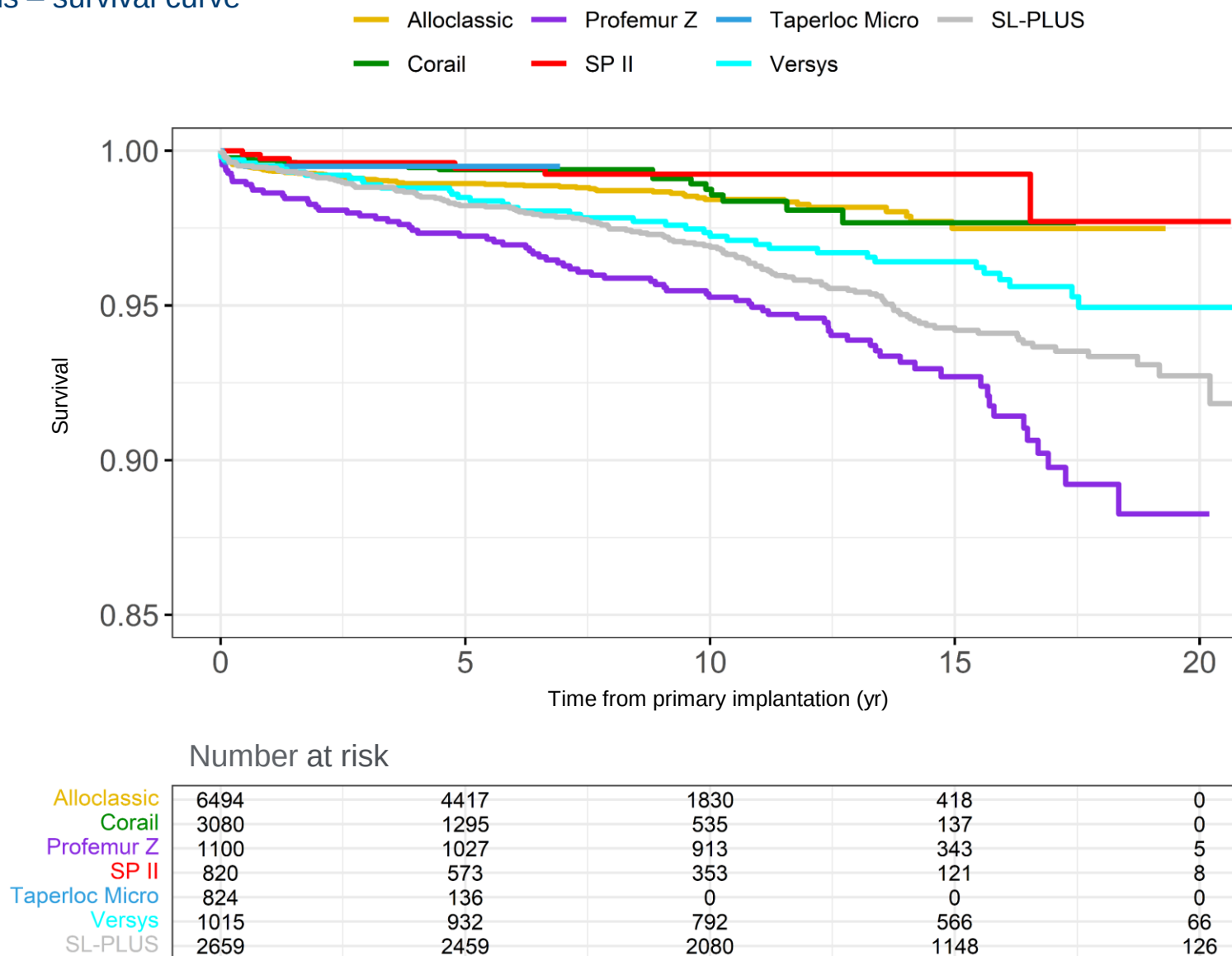


Number at risk

CoC	1995	1702	1199	597	108
CoPE	638	595	498	354	17
CoXPE	3575	1088	192	3	0
MoM	71	70	62	35	11
MoPE	4800	4198	2982	1496	100
MoXPE	8146	5225	2497	430	1

Revision hip arthroplasty 2022

7 most used femoral stems – survival curve

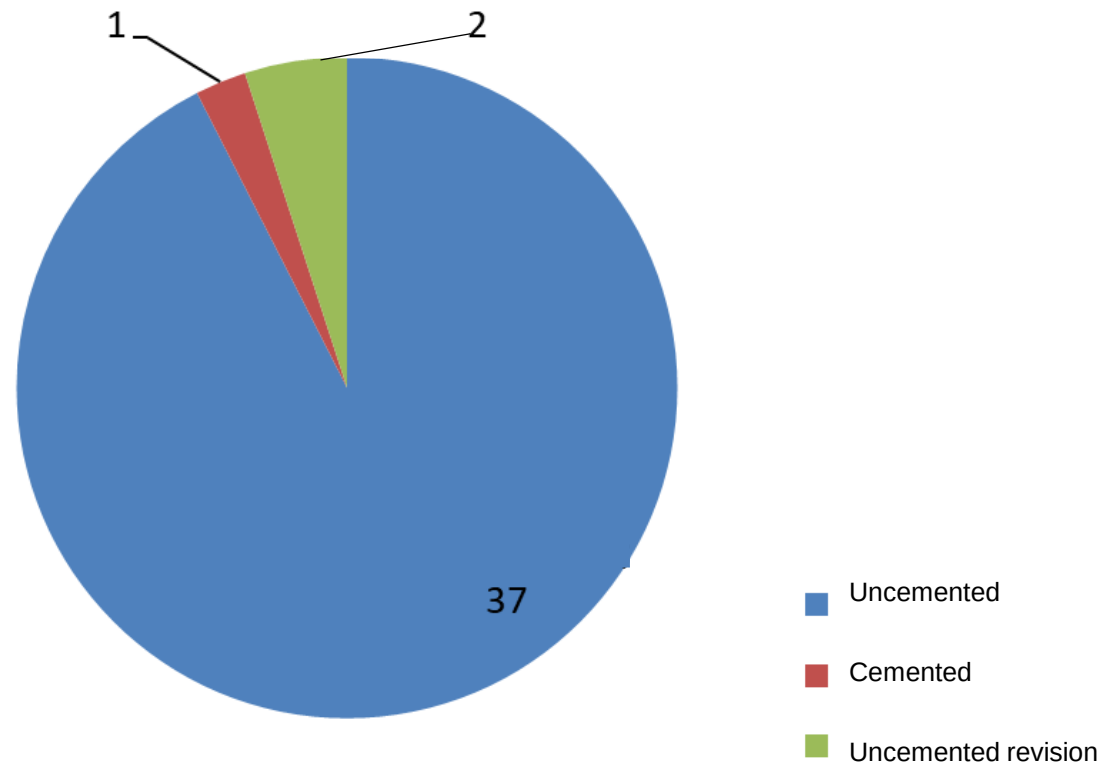


03

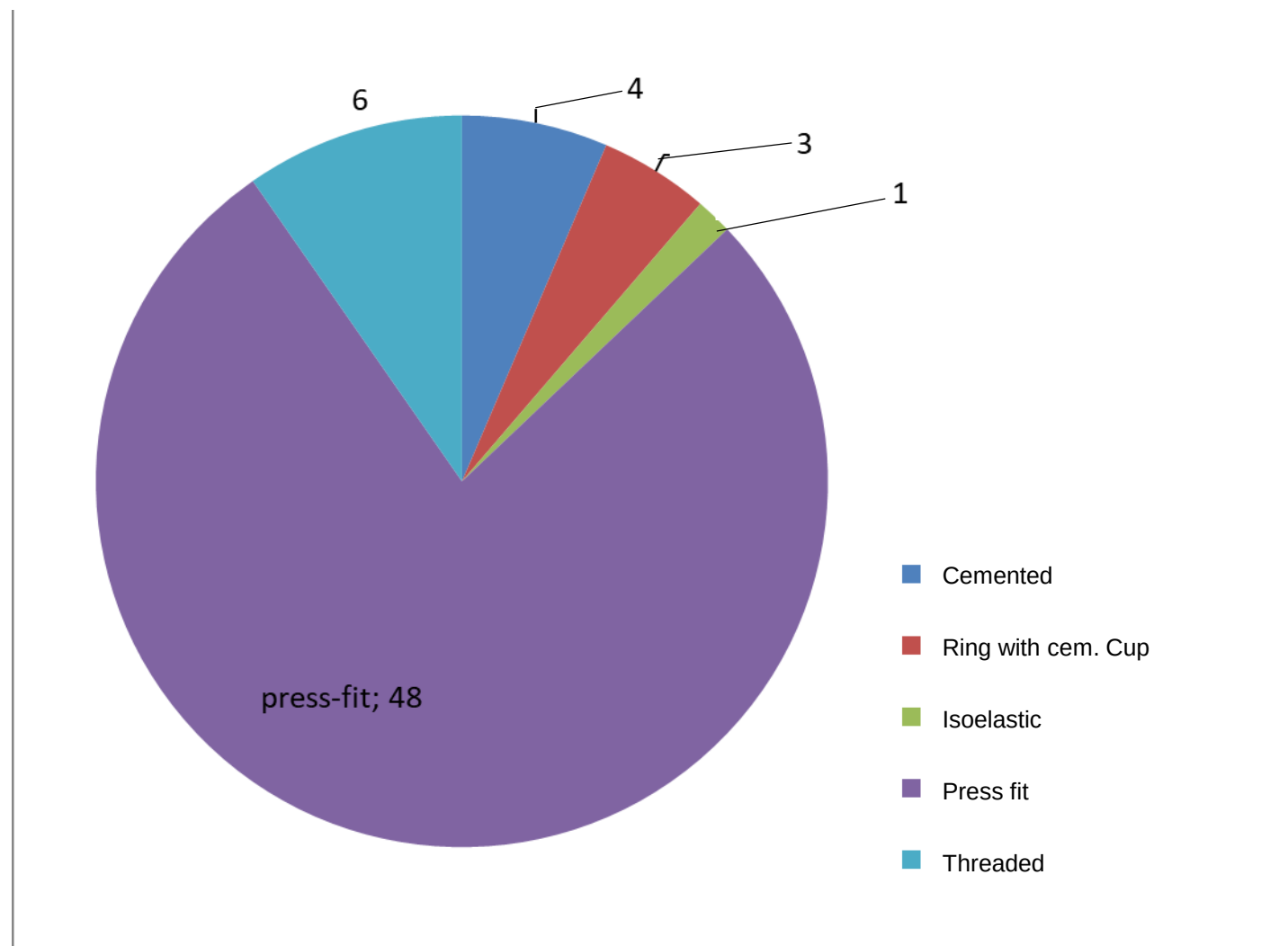
HIP REVISION OPERATIONS 2022

Implant retrieval program

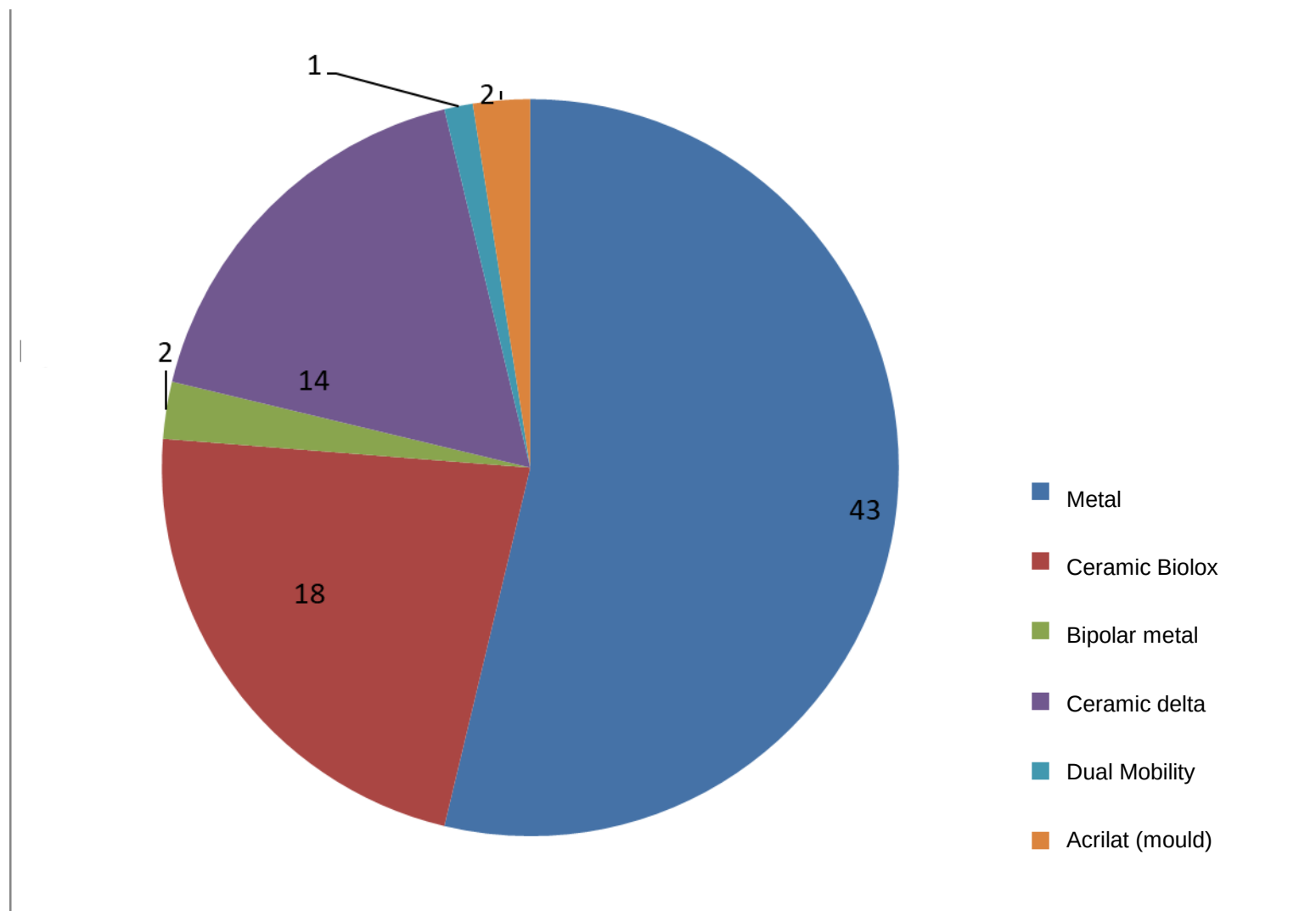
Removed and collected femoral components in 2022 (št. 40)

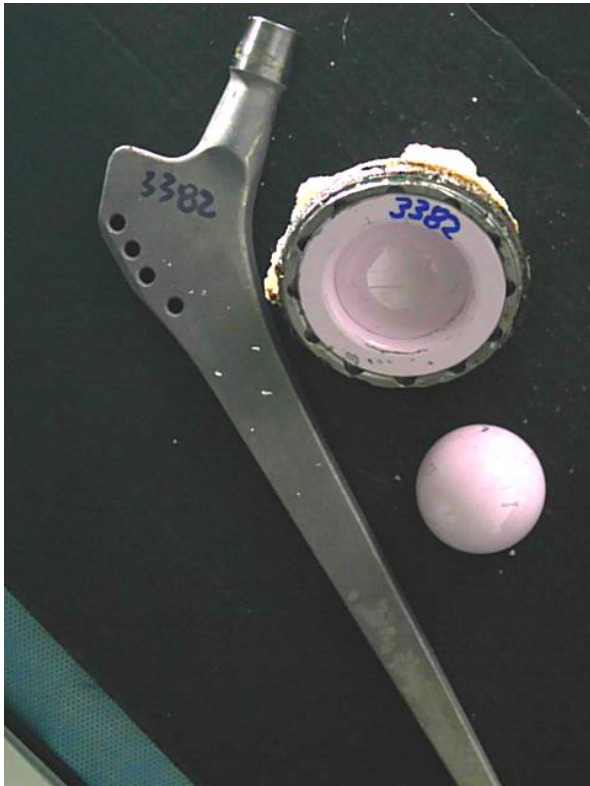


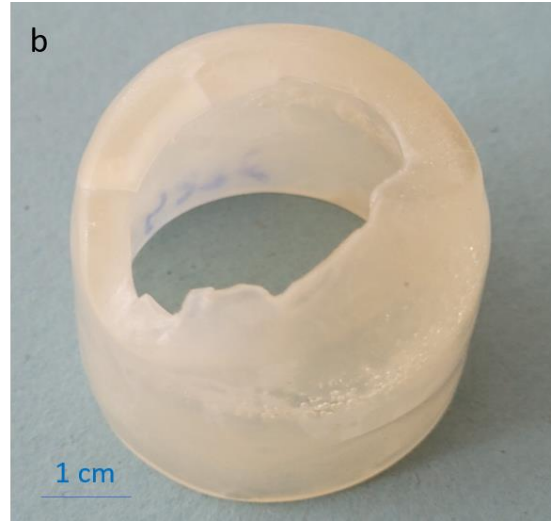
Removed and collected acetabular components in 2022 (št. 63)



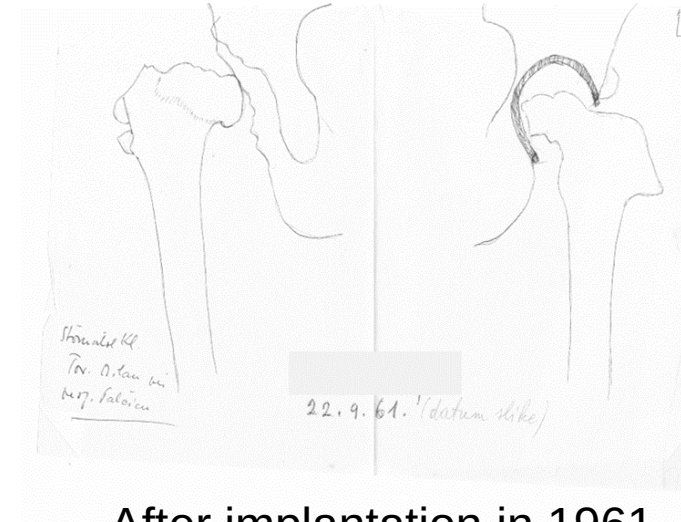
Removed and collected femoral head components in 2022 (št. 8o)







„glass prosthesis“



Time in situ 60 yr

After implantation in 1961

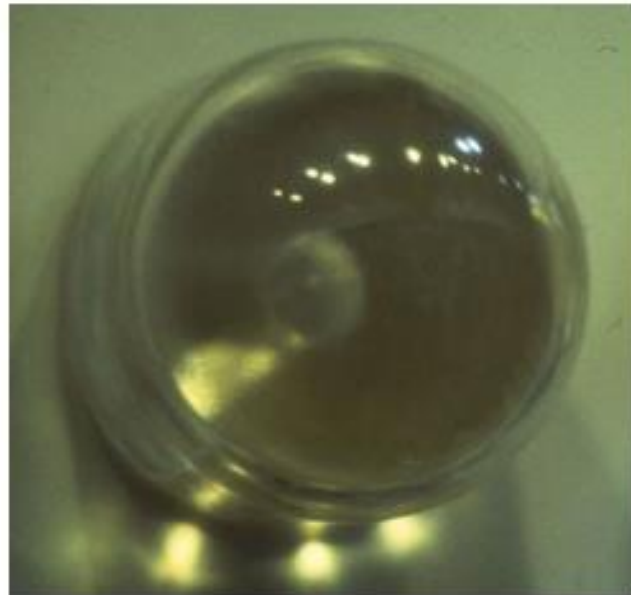


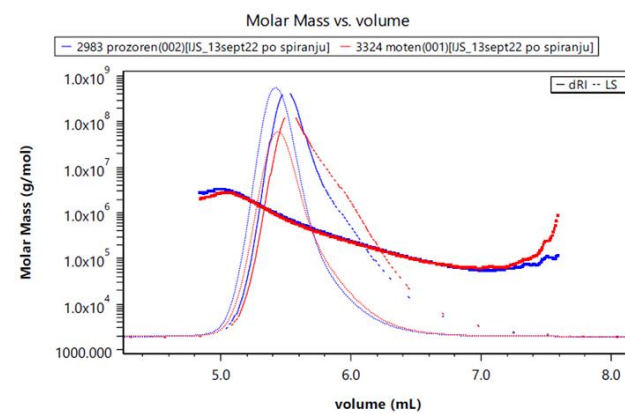
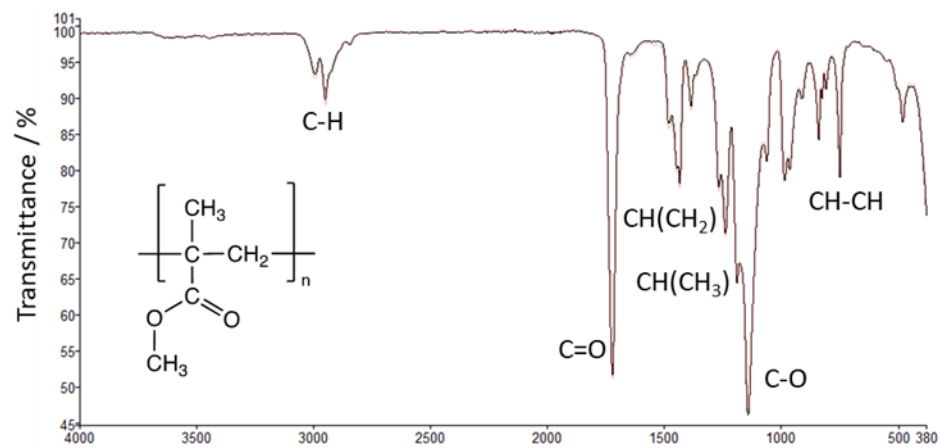
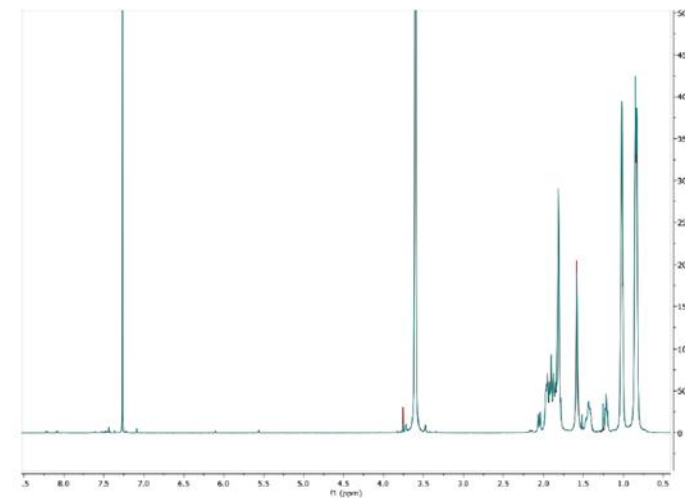
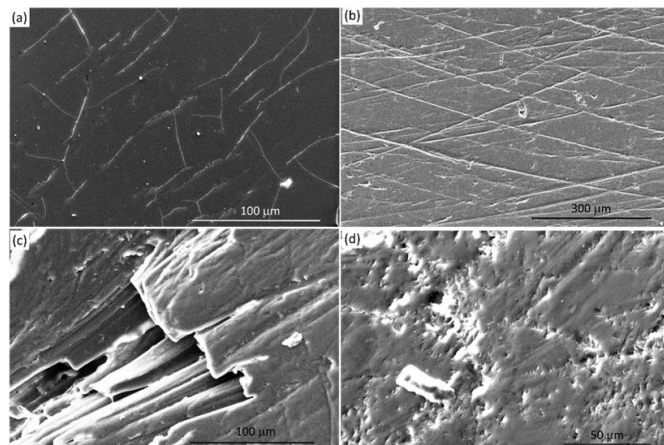
Fig. 8 Pyrex mould



Fig. 1 Marius Nygard Smith-Petersen

Smith-Petersen:
Mould artroplasty

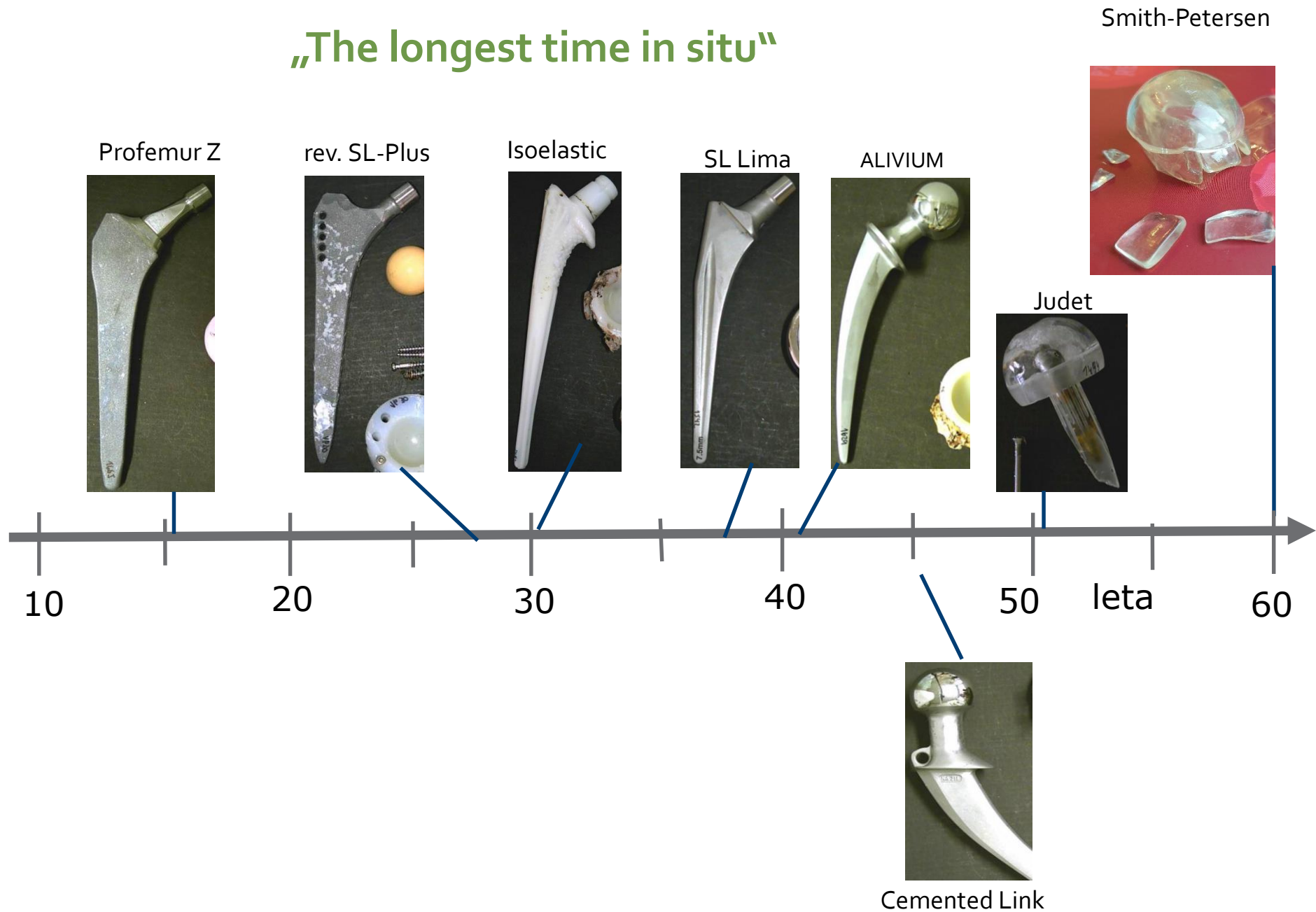
Chemical analysis and surface analysis



Removed stems – time in situ 2009-2022 (collected)

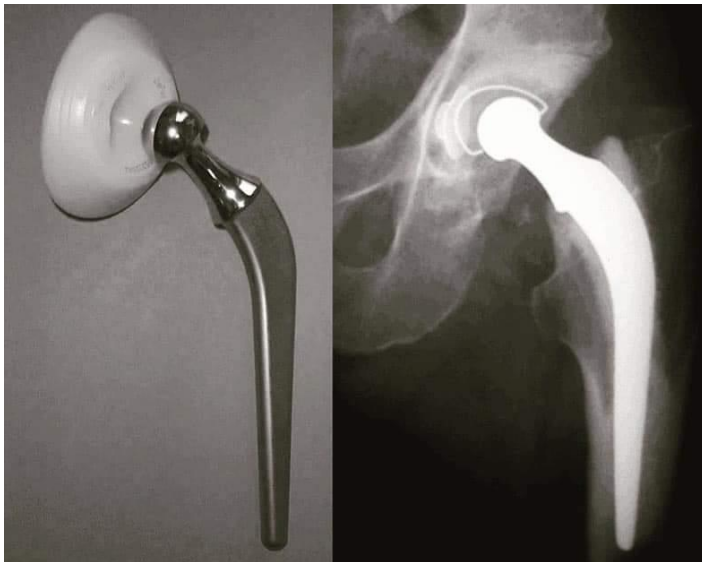
Charnley-Mueller stems (št. 59) (2009-2018)	23,5 ± 7,0 yr (10,8 – 41,1)
izoelastična stems (št. 174) (2009-2021)	16,2 ± 5,0 yr (5,1 – 30,8)
straight SL cem. stems (št. 168) (2009-2019)	13,0 ± 6,5 yr (0,5 – 36,4)
SL-Plus ZM stems (št. 179) (2009-2022)	10,0 ± 6 yr (0 – 27,4)
Profemur stems (št. 77) (2009-2021)	7,3 ± 4,8 yr (0,1 – 17,5)

„The longest time in situ“



November 2022 marks the 60th anniversary of the implantation of the first 'Charnley prosthesis', which revolutionized arthroplasty (Wrightington center for hip surgery)

Sir John Charnley, 1911-1982



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ORTHOPAEDIC SURGERY



60 years of Charnley–Muller Alivium hip prosthesis: the revision percentage and tribo-corrosion sequelae after a mean of 27 years

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Abstract

Introduction The main aim was to analyse the series of 29 collected cemented Charnley–Muller Alivium retrievals with the meantime in situ of 27 years. In addition, the revision rate of 1425 Alivium prostheses implanted at our institution between 1977 and 1992 was calculated.

Materials and methods The revision percentage of the Alivium cohort was calculated up to 45 years of follow-up and compared to that of all total hip arthroplasties (THAs) implanted in the same period (No. 5535). Metal and polyethylene retrieved components were inspected in 29 cases for wear damage and roughness. Wear particles were retrieved from periprosthetic tissue using digestion protocols and their composition, morphology, and size distribution were investigated. Periprosthetic tissue was analysed histologically.

Results The revision percentage of the Alivium cohort was 16% at 45 years of follow-up. It was comparable to all the THAs implanted at the same time (18%). The shape of polyethylene particles isolated from periprosthetic tissue corresponded to the wear pattern on polyethylene cups. Polyethylene particles were the main wear product, with the majority (68%) of particles smaller than 0.1 μm . Metal particles were rare with two types: CoCr and Cr based. Histological analysis showed that in 14 out of 18 specimens, the metal particles were graded + 1, reflecting that the metal loading in the periprosthetic tissue was low.

Conclusions Our study represents valuable data not reported previously on the survival rate of Charnley–Muller prostheses at 45 years of follow-up and a unique insight into the collected retrievals from the materials' point of view.

Keywords Charnley–Muller hip prosthesis · Wear · Wear particles · Revision percentage



Citation:

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