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Cementless Total Knee Arthroplasty is Performed in Younger Patients

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Faculty Disclosure Information

- Nothing to disclose.

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INTRODUCTION

Cement fixation remains the predominant technique in total knee arthroplasty, despite the advent of cementless (press-fit) alternatives.

As press-fit TKA grows in use, press-fit TKA may be greater utilized in certain populations first, thus lowering the generalizability of early studies across groups impacted by social determinants of health.[1]

If not adequately examined, varied adoption of press-fit TKA can inadvertently affect access and the development of appropriate indications, or skew analysis of short and long-term outcomes.

METHODS

- Consolidated large registry data, includes all patients who underwent primary total knee arthroplasty (TKA) for osteoarthritis indications between December 2015 and April 2024 at UPMC facilities (n=26,257).
- Objective: identify difference between patients receiving osteoarthritis-indicated cemented and press-fit TKA in terms of post-operative measures of health and hospital utilization
- Excluded: primary or secondary indications of TKA as tumor-related or oncologic in nature, due to trauma or fracture, or as a revision.
- Statistical methods: multivariate regression and logistic regression models. Chi squared tests as well as t-tests were conducted to examine significance of relationship and differences in patient populations between independent categorical variables such as demographics, gender, and cement or press-fit TKA.

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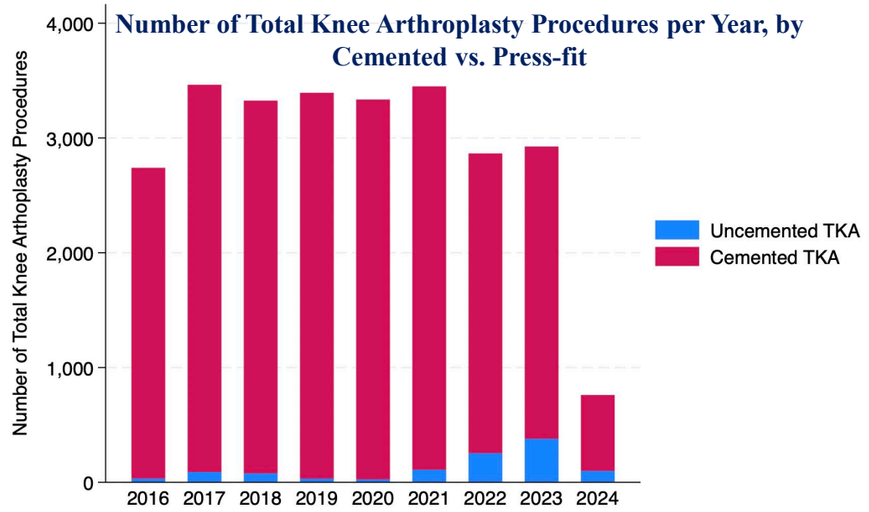
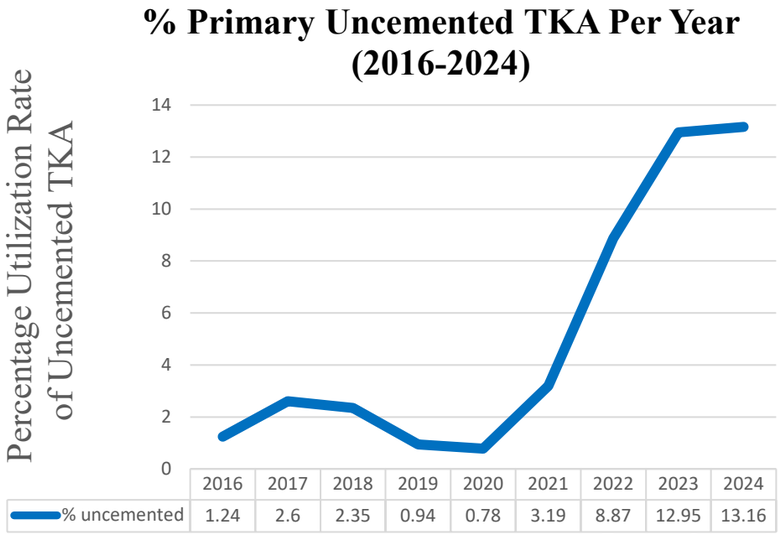
RESULTS





	2016	2017	2018	2019	2020	2021	2022	2023	2024
% uncemented	1.24	2.6	2.35	0.94	0.78	3.19	8.87	12.95	13.16

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RESULTS (CONT)

Descriptive Characteristics of Pressfit vs. Cemented TKA Patients

	Press-fit (n)	Cemented (n)	Mean (Press-fit)	Mean (Cemented)	Diff	St Err	t value	P value
Duration of Surgery (minutes)	1100	25092	79.972	85.795	-5.823	0.781	-7.45	0.000
BMI	1097	24392	36.188	35.674	0.5135	0.2265	2.25	0.0235
Age	1103	25154	63.381	67.774	-4.393	.274	-16.05	0.000
Elixhauser Score Index	1063	21228	1.909	2.198	-0.288	0.049	-5.95	0.000

- Cemented TKA was **longer in duration** than press-fit TKA, t(26190) = -7.46, p<0.001
- Cemented TKA was associated with **lower BMI**, t(25487)= 2.26, p<0.005.
- Cemented TKA associated with **greater age** than press-fit TKA, t(26255) = -16.04, p<0.001
- Cemented TKA was associated with a **higher Elixhauser Index Score**, t(22289)= -5.95, p<0.001.

RESULTS (CONT)

Chi-Square Tests of Explanatory Variables, by Cemented Status

	Pearson Chi Square	Degrees of Freedom (n)	P value
Gender (Male=1)	39.1463	1	0.000
Comorbid Diabetes	7.1543	1	0.007
Active Tobacco Use	9.1965	1	0.002
Active Illicit Substance Use	8.3432	1	0.004

- The groups also differed significantly by:
  - gender, $c^2(1, n= 26,255) = 39.146$, $p > 0.001$
  - race, $c^2(1, n= 26,254) = 10.272$, $p > 0.05$
  - comorbidity of diabetes, $c^2(1, n= 23,695) = 7.154$, $p >0.001$
  - active tobacco use, $c^2(1, n= 26,257) = 9.197$, $p > 0.01$, and
  - active illicit substance use, $c^2(1, n= 26,257) = 8.343$, $p >0.01$.

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RESULTS (CONT)

Controlling for BMI, age, race, and Elixhauser Score Index, cemented TKA was associated with:

- an increase of 132.3 (32.68) **days in minimum days in the ED**, $p<0.01$
- an increase of 7.044 (0.793) **minutes of surgery duration**, $p<0.01$, and
- 0.309 (0.065) **increase in the number of ED returns**, $p<0.01$.
- a 1-year patient-reported Knee injury and Osteoarthritis Outcome Score (KOOS) Score Change significant increase of 2.99 (1.23), $p<0.05$.

Logistic regressions showed that the incidence of complications, or mortality within 30 days or within 1 years were **not** significantly associated with cemented TKA.

CONCLUSION

- Cementless (press-fit) TKA was performed in younger patients compared to cemented TKA in this medical center.
- Cemented TKA appears associated with a minor increase in surgery duration.
- Cemented TKA appears associated with a statistically significant although possibly clinically insignificant increase in ER returns and longer minimum stays.
- The one-year KOOS score change showed a modest but significant improvement of 2.99, $p<0.05$.

As the utilization rate of uncemented TKA rises, these results indicate the need for more data comparing uncemented (press-fit) versus cemented TKA across shorter and longer-term outcomes, particularly given age and other differences across patient groups.

REFERENCES

1. Jabbouri SS, Jones B, Alemayehu G, Jimenez E, Mullen K, Bernstein J. The Utilization of Press-Fit Total Knee Arthroplasty is Not Evenly Distributed: A National Registry Review. J Am Acad Orthop Surg. 2024;32(11):495-502. doi:10.5435/JAAOS-D-23-01035