



Cementless Knees



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Course 2025

No disclosures

Background

- Cemented fixation = gold standard for decades^[1]
- Early cementless *designs* had issues with fixation^[1]
- Modern implants → porous coatings, 3D printing, biologic fixation^[2,3,8]



Changing Demographics

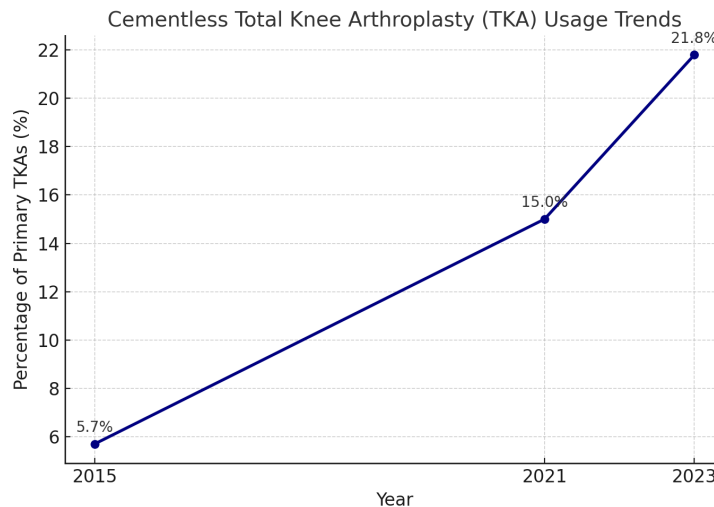
- TKA volume rising: projected >3.5 million annually in US by 2030^[4]
- Historically limited to young, healthy males^[1]
- Recent registry data: comparable outcomes in women and higher-BMI patients^[5,6,9]
- Age >70 not a contraindication: mid to long-term survival remains >95%^[6,10]

Technology Improvements

- Highly porous titanium/tantalum → rapid osseointegration^[2,9]
- 3D printing enables optimized porosity & strength^[2,8]
- Hydroxyapatite/proprietary biomimetic coatings enhance fixation^[3]

- From 2015 to 2023, the use of cementless TKA increased by from ~5% to ~22%

The American Joint Replacement Registry



Clinical Evidence

Improved performance of cementless total knee arthroplasty (TKA) across international registries: a comparative review

Meadhbh Ni Mhiochain de Grae¹ • Armon Nasehi¹ • David F. Dalury² • Bas A. Masri³ • Gerard A. Sheridan¹

- **Recent analysis of six English speaking registries from 2014-22/23:**

- National Joint Registry (British)
- Australian Registry
- New Zealand Registry
- Swedish Registry
- Canadian Registry
- American Joint Registry

- Three registries showed overall lower revision rates compared with prior cementless data
- Lower revision rates for cementless vs cemented TKA in the most recent reports:
 - American (3.2% cemented vs. 2.8% cementless)
 - New Zealand (11.8% cemented vs. 4.5% cementless)

Clinical Evidence

■ Randomized trials:

- Comparable fixation cemented vs uncemented hydroxyapatite coated TKAs^[3]
- Modern cementless designs comparable to cemented at early follow-up^[8]
- Midterm RCT shows non-inferiority cementless vs cemented^[10]



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Mheen,
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S. Toksvig-Larsen

■ KNEE

Fixation and clinical outcome of uncemented peri-apatite-coated *versus* cemented total knee arthroplasty

FIVE-YEAR FOLLOW-UP OF A RANDOMISED CONTROLLED TRIAL USING RADIOSTEREOMETRIC ANALYSIS (RSA)

CLINICAL ARTICLE

Randomized Controlled Trial of a Novel Cementless vs. Cemented Total Knee Arthroplasty: Early Clinical and Radiographic Outcomes

Enze Zhao, MD^{1†}, Xiaoyan Zhu, MS^{2†}, Haiwei Tang, MM¹, Zhenyu Luo, MD¹, Weinan Zeng, MD¹, Zongke Zhou, MD¹ 

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Cementless Versus Cemented Total Knee Arthroplasty

Concise Midterm Results of a Prospective Randomized Controlled Trial

Charles P. Hannon, MD, MBA, Rondek Salih, MPH, Robert L. Barrack, MD, and Ryan M. Nunley, MD

Investigation performed at Washington University in St. Louis, St. Louis, Missouri

Advantages Beyond Fixation

- Avoids cement-related complications (embolism, fracture, technique errors)^[1]
- Potentially easier revision: no cement mantle removal, bone preservation^[1]
- Reduced OR time by eliminating cementing step^[7]

Addressing Counterpoints

- Historical tibial failures? → Modern porous designs overcome early issues^[2,3,8]
- Cost? → Offset by OR efficiency & reduced revisions^[7,11]
- Elderly patients? → Evidence supports cementless TKA in multiple patient populations, including women, obese patients, and even older cohorts^[5,6,9]
- Subsidence? Minimal, and when it occurs, typically shows stable migration by 3m^[9]

Looking Forward

- Cementless TKA should not be restricted to the '*ideal*' candidate
- Evidence supports safe use in broader populations
- Adoption should reflect data, not dogma
- As with hips → cementless will become the modern standard^[2,8]

****If biologic fixation works best in hips, why not in knees??****



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