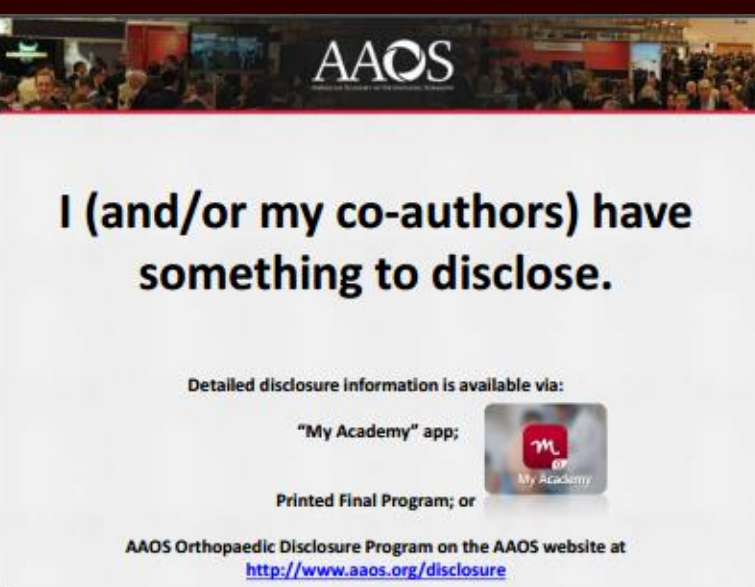


Results of Cemented versus Cementless Primary Total Knee Arthroplasty Using the Same Implant Design

Adam J. Miller B.S., Jeffrey Stimac M.D., Anthony Feher, M.D., Langan Smith B.S., Arthur Malkani M.D.
University of Louisville, KentuckyOne Health, Louisville, KY



Introduction

- Although cemented primary total knee arthroplasty (TKA) continues to be the gold standard, there are patient populations with higher failure rates with cemented TKA's, including obese and younger, active patients.
- Cementless TKA usage continues to increase due to the potential benefits of long term biologic fixation similar to the rise in cementless THA.
- Patients are living longer which makes use of cementless or biologic fixation more attractive.
- The purpose of this study was to compare the clinical and radiographic results of cemented versus cementless TKA using the same kinematically designed implant.

Materials & Methods

- 200 patients undergoing primary cementless TKA using a highly porous tibial baseplate with mean age of 64 years (42 – 88 yrs), mean BMI of 33.9, and mean follow up of 27.6 months were compared with a matched cohort of 200 cemented baseplates of the same design with mean age of 64 (43 – 87 yrs), mean BMI of 33.1, and mean follow up of 63.4 months (Table 1).
- Cementless TKA implant consisted of a highly porous titanium tibial baseplate with a keel and four pegs, cementless peri-apatite coated femoral component and cementless patella component with highly crosslinked polyethylene (Fig. 1).
- Clinical and radiographic results were compared including complications and revisions.

	Cementless (n=200)	Cemented (n=200)	p-value
Age (years)	64.3 ± 8.3	64.4 ± 8.2	0.82
BMI	33.9 ± 7.5	33.1 ± 6.5	0.22
Gender	74 Male, 126 Female	74 Male, 126 Female	
KSS Function Score	76.0 ± 20.4	70.2 ± 22.3	0.016
Change in Function Score	35.6 (± 19.8)	26.04 ± 26.6	0.0014
KSS Knee Score	94.1 ± 6.1	91.6 ± 9.8	0.0076
Change in Knee Score	53.8 ± 13.8 13	52.4 ± 16.7	0.385
Follow-up Time (Months)	27.6 ± 3.5	63.4 ± 23.0	<0.00001
# of Aseptic Loosenings	1 (0.5%)	5 (2.5%)	0.212
# of Infections	1 (0.5%)	0 (0.0%)	0.316
Total # of revision TKAs	7 (3.5%)	8 (4.0%)	0.069

Table 1: Demographics and clinical results

Reason for revision	# of revisions - Cementless	# of revisions - Cemented	p-value
Aseptic Loosening	1 (0.5%)	5 (2.5%)	0.212
Infection	1 (0.5%)	0 (0.0%)	0.316
Extensor Mechanism Rupture	1 (0.5%)	0 (0.0%)	0.316
Flexion Instability	1 (0.5%)	2 (1.0%)	0.562
Global Instability	1 (0.5%)	0 (0.0%)	0.316
Patellar Dislocation	1 (0.5%)	0 (0.0%)	0.316
Patellofemoral Arthrosis	1 (0.5%)	0 (0.0%)	0.316
Fall with open Arthrotomy	0 (0.0%)	1 (0.5%)	0.316
Total # of revisions	7 (3.5%)	8 (4.0%)	0.069

Table 2: Total revision stratification comparison in matched cementless versus cemented TKA.

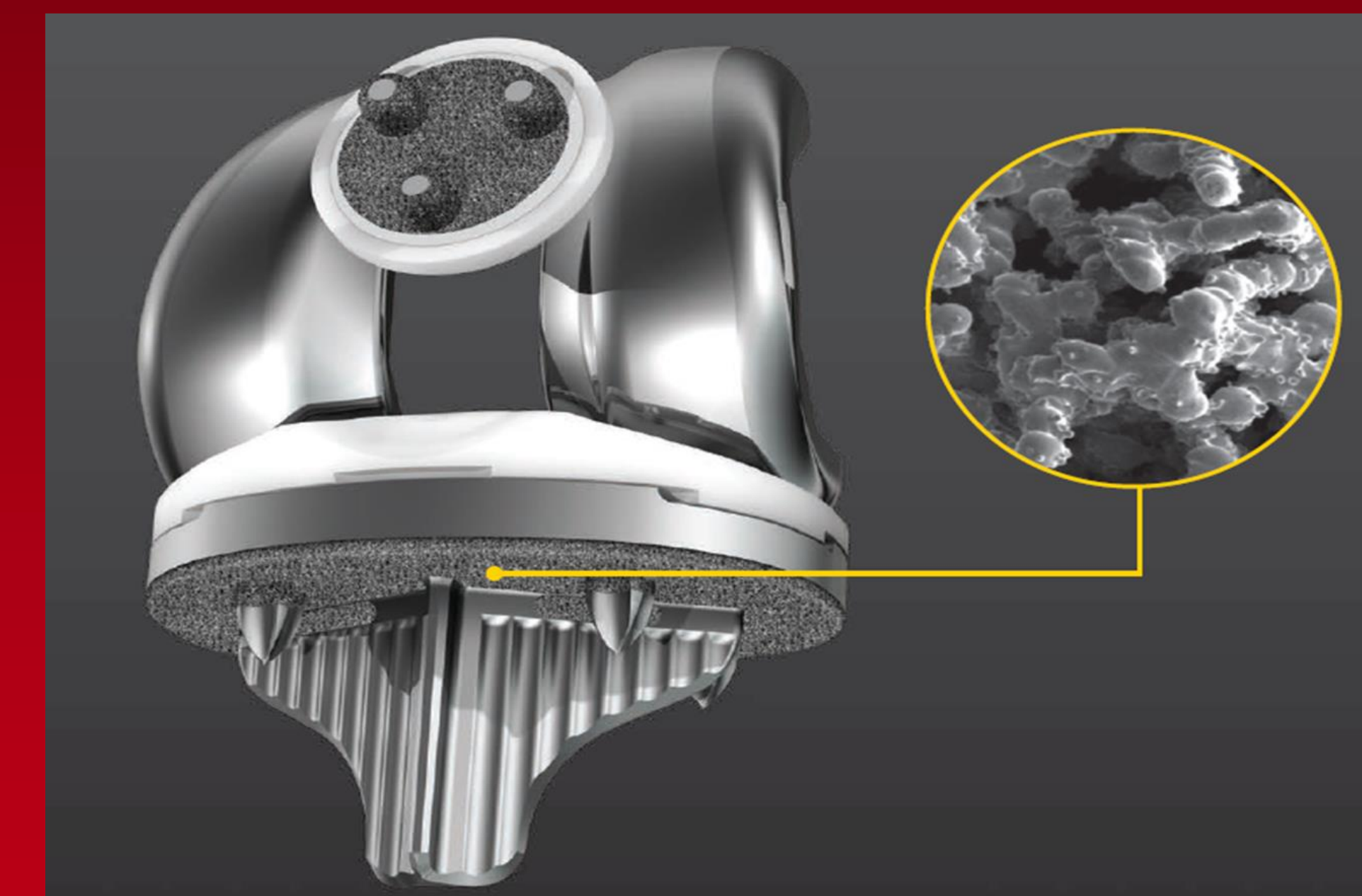


Figure 1: Stryker Triathlon Tritanium™ Cementless Tibial Baseplate

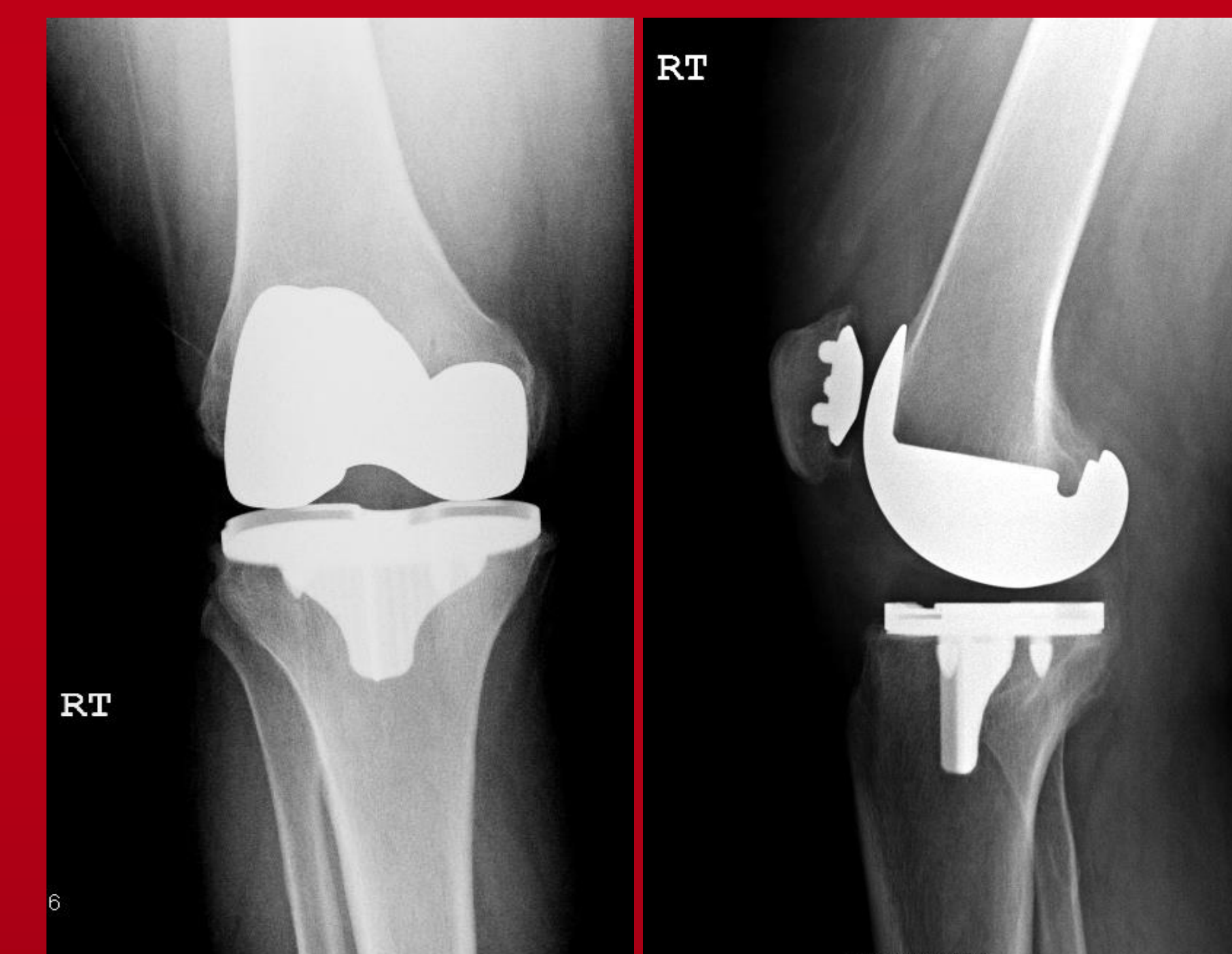


Figure 2: AP and lateral view x-rays of cementless TKA 2 years following index procedure.

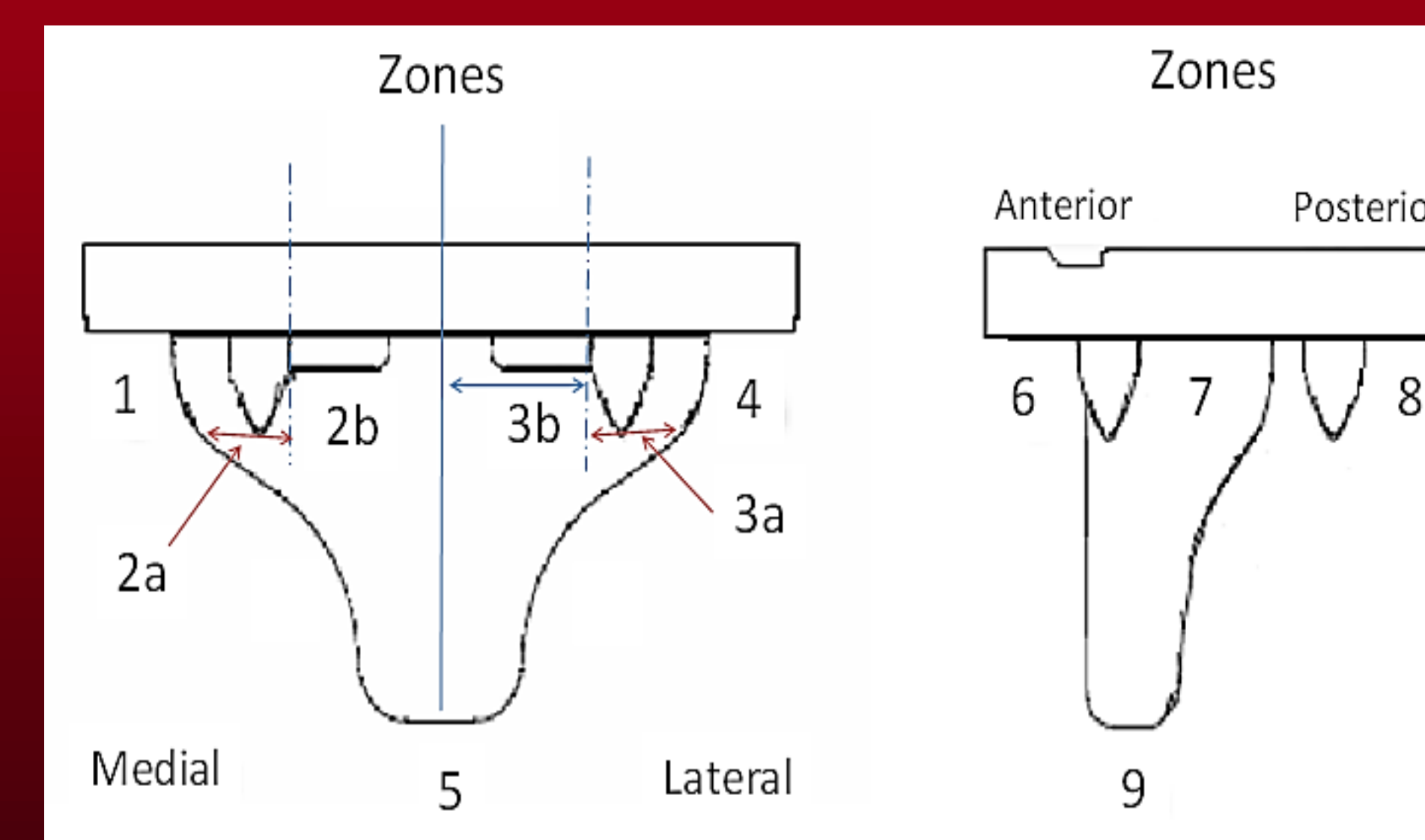


Figure 3: Zonal analysis using radiographs demonstrated biologic fixation with multiple zones of trabecular spot welding with the greatest density around the four pegs.

Results

- No statistical difference in age, BMI, or preop KSS scores between the two groups (p=0.4, p=0.24, p=0.2).
- Cementless group had one case of aseptic tibial component loosening (0.5%), whereas the cemented group had 5 cases of aseptic loosening (2.5%).
- Overall revisions and complications were similar in both groups (Table 2).
- Dense areas of spots welding were noted primarily around the pegs of the cementless tibial baseplate (Fig. 3). There were no cases of any progressive radiolucent lines at minimum 2 year follow up in the cementless group.

Conclusions

- Results of cementless 2nd generation TKA using a highly porous tibial baseplate and highly crosslinked polyethylene appears promising with early data demonstrating at least equivalent results to cemented TKA.
- Many of the early design flaws of 1st generation cementless TKA leading to increased wear, osteolysis and loosening have been addressed with current generation polyethylene and improved fixation methods using highly porous implants.
- As patient demographics undergoing primary TKA has changed to include younger, more active, and obese patients along with increased life expectancy, the role of cementless TKA has evolved in order to provide durable, long term, biologic fixation.