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Total Knee Arthroplasty with Non-Stemmed Tibial Components among Obese Patients: Clinical and Radiologic Evaluation and Review of Literature

***Armin Akbarzadeh*[1,2], *Ehsan Fallah*[2*], *Seyed Ali Hashemi*[1], *Mohammad Tahami*[1], *Babak Pourabbas Tahvildari*[1], *Saeed Solooki*[1]**

[1]*Bone and Joints Diseases Research Center, Department of Orthopedic Surgery, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran*
[2]*Department of Orthopedic and Trauma Surgery, AJA University of Medical Sciences, Tehran, Iran*

***Corresponding author:** *Ehsan Fallah*
Address: Department of Orthopedic and Trauma Surgery, AJA University of Medical Sciences, Postal code: 14117-1854, Tehran, Iran.
e-mail: dr.ehsan.fallah@gmail.com

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ABSTRACT

Objective: This study aimed to evaluate the radiologic and clinical outcomes of TKA with non-stemmed tibial components in relation to their body mass index (BMI).
Methods: In this retrospective cohort study, the outcome of TKA with non-stemmed tibial components based on their BMI was evaluated (BMI<30 vs. BMI≥30). The patients' function was assessed using the International Knee Documentation Committee (IKDC) and Lysholm knee questionnaires. Radiologic evaluation for probable signs of loosening was performed using two quantitative scoring systems by Ewald and Bach *et al.* Moreover, we reviewed the current literature on the application of non-stemmed tibial components in obese patients.
Results: Twenty-one patients (two men and 19 women) with BMI≥30 and a mean age of 65.1±9.5 years, and 22 patients (three men and 19 women) with BMI<30 and a mean age of 63.6±8.5 years were studied. The mean follow-up periods with BMI≥30 (47.0±19.8 months) and BMI<30 (49.2±18.7 months) were comparable (p=0.618). No patients in either group experienced clinical loosening. Besides, none of the patients had any kind of revision surgery. The patients in both BMI groups had comparable IKDC scores (both the total score and its sub-scores; p>0.05). Furthermore, the total Lysholm knee scores were similar in both groups (p=0.122). Using both scoring systems, the peri-prosthetic bone radiolucency near the tibial components was similar in both groups (p>0.999).
Conclusion: The present study found no significant difference in the radiologic or clinical outcome of non-stemmed TKA in patients with BMIs under and over 30.

Keywords: Knee prosthesis, Obesity, Aseptic loosening, Lysholm knee score, Body mass index.

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Table 3. The previous studies evaluated the outcome of total knee arthroplasty using a non-stemmed tibial component in obese patients

Author (year)	Methodology	Number of non-stemmed	BMI, kg/m²	Age, mean, years	Sex (M:F)	Number of long-stemmed	Outcome assessment method	Outcome
Parratte *et al.* (2016) [19]	RCT	60	>30	68 (9)	68:52	60	NKSS, KOOS, VAS, SF-36	NS
Angers-Goulet M *et al.* (2017) [20]	Prospective cohort	28	≥35	65.2	45:46	-	KSS, KSRESS	good functional, clinical, and radiological outcomes
Steere JT *et al.* (2018) [9]	Retrospective cohort	128	≥35	62 (8.7)	102:79	50	KSRESS, PBS	NS
Fournier G *et al.* (2020) [17]	Retrospective cohort	105	>30	69.5 (7.3)	85:20	35	KSS	Similar function but a higher rate of aseptic loosening in non-stemmed prosthesis
Samy AM *et al.* (2020) [22]	Retrospective cohort	92	>30	65.2 (5)	34:48	99	KSS, KSFS	higher functional outcome in stemmed prosthesis
Elzohairy MM *et al.* (2020) [23]	RCT	88	≥35	55.69 (8.45)	52:36	92	KSS, KSRESS	higher functional outcome of stemmed prosthesis
Longawa, L *et al.* (2020) [21]	Retrospective cohort	534	>35	67.8	28:72	-	Aseptic loosening occurrence	No aseptic loosening happened
Garceau, SP *et al.* (2022) [24]	Retrospective cohort	850	>35	64.7	57.4:42.6	500	Aseptic loosening occurrence	Earlier aseptic loosening occurrence in non-stemmed prosthesis
Mohammad MM *et al.* (2022) [8]	RCT	134	≥30	57 (4)	46:88	130	KSS, KSRESS, and its modified version	NS
Present study	Retrospective cohort	21	≥30	65.1 (9.5)	2:19	-	IKDC, Lysholm, KSRESS, and its modified version	NS

M: F: male to female ratio; RCT: randomized controlled trial; VAS: visual analog pain score; SF-36: Quality of life questionnaire; KSS: Knee Society Scores; KSFS: Knee Society functional scores; NS: no significant difference between the outcome of Total knee arthroplasty using non-stemmed and stemmed tibial component; KOOS: Knee Injury and Osteoarthritis Outcome Score; KSRESS: Knee Society Roentgenographic Evaluation and Scoring System; PBS: percentage based score; IKDC: International Knee Documentation Committee

Declaration

Ethics approval and consent to participate: The study protocol was approved by the ethics committee of AJA University of Medical Sciences (IR.AJAMED.REC97001800). Besides, written informed consent was obtained from all participants.

Consent for publication: All the authors gave their consent for the publication.

Conflict of Interest: None declared.

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Authors' Contribution: AA: statistical analysis, interpretation of results, preparing draft**;** EF: study concept, study design, revision of the manuscript; SAH: data gathering, interpretation of data, revision of the manuscript**;** MT: data gathering, interpretation of data, revision of the manuscript**;** BPT: data gathering, data analysis, preparation of the manuscript**;** SS: data gathering, interpretation of results, preparation of the manuscript

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