

DENTAL TREATMENT NEEDS FOR ELIMINATION OF ORAL INFECTION SOURCES IN PATIENTS SCHEDULED FOR HIP AND KNEE ARTHROPLASTY

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Abstract

Aim of study was to assess the dental treatment needs for elimination of oral infectious sites related to sociodemographics and individual factors in patients scheduled for hip/knee arthroplasty. **Materials and method.** This cross-sectional study included 51 patients over the age of 50, scheduled for primary hip or knee arthroplasty at the Clinical Rehabilitation Hospital in Iași, Romania, who underwent complete dental evaluation according to predefined inclusion and exclusion criteria. The need for dental treatments was categorized by type of intervention, including periodontal therapy, endodontic treatment, tooth extractions, and prosthetic adjustments. **Results.** Endodontic and periodontal infections, along with misfitted fixed prosthetic restorations, were significantly more frequent in male, rural, and non-obese patients, indicating disparities in oral health status across sociodemographic groups ($p < 0.001$). Patients aged 50–65 years and those with hip osteoarthritis or systemic comorbidities demonstrated a higher need for dental interventions addressing chronic oral infections prior to arthroplasty ($p < 0.001$). Smoking, poor oral hygiene, and systemic conditions were consistently associated with a greater prevalence of oral infectious sources, reinforcing the need for targeted dental screening in these high-risk groups ($p < 0.001$). **Conclusions.** The need for dental treatments targeting the elimination of oral infectious sources in patients awaiting hip or knee arthroplasty is significantly influenced by sociodemographic and systemic factors. Variables such as male sex, rural residence, smoking, and the presence of systemic comorbidities were associated with a higher prevalence of untreated infections, underscoring the importance of individualized dental screening and intervention protocols prior to orthopedic surgery.

Key words: arthroplasty, hip, knee, osteoarthritis, oral infectious sources

INTRODUCTION

Dental and periodontal infections are not uncommon in medical settings, particularly in emergency departments. Many individuals seek care in medical rather than dental facilities due to financial limitations, restricted access to dental services, dental anxiety, or the mistaken

belief that antibiotics alone are sufficient to resolve the issue. Consequently, medical professionals—often lacking specific training in dental pathology—may be faced with managing these infections [1]. Increasingly, the general practitioners medical recognize the relationships

between oral health and overall health and engage in oral health promotion [2].

For patients awaiting hip or knee arthroplasty, such infections are of special concern due to the risk of hematogenous dissemination to prosthetic joints. Over the past two decades, the importance of oral health in the preoperative management of patients undergoing total hip arthroplasty (THA) and total knee arthroplasty (TKA) has gained increasing recognition. This evolution reflects a broader understanding of the link between oral and systemic health, particularly the potential risks oral infections may pose in surgical contexts. Periprosthetic joint infection (PJI) is the most common cause of failure in total joint arthroplasty, albeit with a low overall incidence of 1–2% [3]. Nonetheless, the literature on the role of oral pathogens in the etiology of PJI remains inconsistent, with reported incidence ranging widely from 0.03%–0.04% [4, 5] to as high as 6%–13% [6-8]. Within TKA, the PJI rate is as high as 0.5% to 2% [9, 10], and the rate of PJI within hip arthroplasty ranges from 0.5% to 1% [9]. The risk for developing a PJI is greatest in the first 2 years following joint replacement [11]. Complications can persist on longer follow-up: in a 15-year review, a cumulative failure rate of TKA was seen to be 6.1%, of which, specifically, 2.0% was due to PJI-related revisions or reoperations [12]. These changes are accompanied by increased short-term morbidity and mortality, and result in significant organisational and financial implications for the healthcare system. Further complications of PJI may be reinfection, joint disarticulation, and persistent disability [13]. These data support the hypothesis that that chronic oral

infections, such as advanced periodontitis or untreated periapical lesions, may contribute to the development of late prosthetic infections, particularly in patients with systemic comorbidities or compromised immunity. Shared responsibility between orthopedists and dentists could lead to the localisation of infectious sites in the mouth, such as deep periodontal pockets or teeth with indication for extraction or endodontic treatment, before performing an elective joint arthroplasty [14]. Use of a standardised preoperative dental assessment list may reduce the risk of PJI, particularly in patients with multiple comorbidities. Effective interdisciplinary care may require the electronic health record integration and frequent interprofessional consultations contributing to the treatment plan [15]. With an ageing society and an increasing number of joint replacements, a prophylactic pre-operative approach related to oral infection sources is more important than ever in order to prevent post-surgical complications from occurring. Collaboration between orthopaedic surgeons, dentists, and other fields is required to come up with standardised protocols for comprehensible patient care.

Aim of study was to assess the dental treatment needs for elimination of oral infectious sites related to sociodemographics and individual factors in patients scheduled for hip/knee arthroplasty.

MATERIALS AND METHOD

This cross-sectional research was performed on a 51 patients with mean age

67.51 +/- 5.78 years (gender: 21- males, 30-females; residence: 30-urban, 21-rural) scheduled for hip/knee arthroplasty in Clinical Rehabilitation Hospital Iasi (Romania). Inclusion criteria were: age > 50 years, eligible of hip or knee osteoarthritis, available for of complete dental check-up. Exclusion criteria were: revision arthroplasty or previous joint prosthesis, systemic infection at the evaluation time, complete edentulism, incomplete medical records, unavailable for dental check-up.

The research was carried out in accordance with the ethical principles of the Declaration of Helsinki and received approval from the Ethics Committee of "Grigore T. Popa" U.M.Ph. Iasi. A written consent was provided by each patient.

An orthopedic surgeon diagnosed hip or knee osteoarthritis according to established clinical and radiological criteria. Clinically, the diagnosis was confirmed by the history of chronic joint pain, restriction in motion, and crepitations on movement of the joint. Radiographic confirmation was defined according to the Kellgren–Lawrence classification, with a grade greater than or equal to 2 being regarded as diagnostic. All eligible patients were scheduled to undergo primary THA or TKA for end-stage symptomatic OA at least non-responsive to conservative treatment modalities [16]. For all participants, an intraoral clinical and paraclinical examination was carried out by a dentist. The potential sources of dental infection were detected as follows:

- Teeth with endodontic pathology (periapical, endo-periodontal lesions);

- Deep periodontal pockets (PP) (≥ 6 mm, BOP);
- Severe periodontal disease was defined based on the new EFP/AAP guidelines [17];
- Root remnants;
- Misfitted fixed prosthetic restorations.

Treatments aiming to remove oral infectious sources were:

- Periodontal treatment (non-invasive, periodontal surgery);
- Endodontic treatments of chronic periapical lesions (CPL);
- Endodontic retreatment ;
- Treatment of endo-periodontal lesions (EPL);
- Extraction of root remnant;
- Extraction of teeth with advanced mobility;
- Replacement of misfitted fixed prosthetic restoration (FPR).

Dental treatments aiming to remove oral infectious sources were assessed in relation to parameters as follows:

- Sociodemographic parameters (sex, age group, residence);
- OHI index;
- Orthopedic diagnostic;
- Systemic pathology (diabetes, rheumatoid arthritis) ;
- Smoking;
- Obesity.

Statistical Analysis

The need for treatments to remove oral infectious sources (related to various parameters) was evaluated using Pearson Chi-Squared test. p-value of < 0.05 was considered statistically significant, p < 0.01 -highly statistically significant. Statistical analysis was performed in SPSS 29.0.

RESULTS

Table 1 shows the prevalence of infectious oral sites at global level (per patient). Root remnants represented the most frequent source of infection, being found in 43 patients (84.3%). Chronic periapical lesions- CPL) was identified in 12 patients (23.5%), while endo-periodontal lesions (EPL) were diagnosed in 21 patients (41.2%). Thus, endodontic

pathology (source of oral infection) was diagnosed in 33 patients (64.7%). Advanced periodontal disease was detected in the majority of patients: stage 3 – 38 patients (74.5%) ; stage 4 – 9 patients (17.6%). Fixed prosthetic restorations with poor marginal adaptation associated to active periodontal pockets (PP) were identified as source of oral infection in 33 patients (64.7%).

Table 1. Prevalence of oral infectious sites (per patient)

	Oral infection sources	Patients (N)	Patients (%)
1.	Remnant roots	43	84.3%
2.	Endodontic pathology (CPL, EPL)	33	64.7%
3.	Active periodontal disease (stages III-IV)	47	92.1%
5.	Missfitted fixed prosthetic restoration with active PP	33	64.7%

Table 2 shows the need for treatments aiming to remove the oral infectious sources in global sample of patients scheduled for hip or knee arthroplasty. Tables 3-10 shows the distribution of dental treatments aiming to remove oral infection sources and statistical results of PearsonChi-squared test comparing subgroups.

Table 2. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty

Dental treatment	n	%
Periodontal therapy	47	92.2%
Replacement of misfitted FPR with active PP	38	74.5%
Extraction of teeth with advanced mobility	21	41.2%
Extraction of root remnants	17	33.3%
EPL treatments	12	23.05%
CPL endodontic treatments	9	17.06%

The analysis of dental treatments categories by sex revealed several statistically significant differences. Extraction of root remnants was performed significantly more often in males (61.9%) compared to females (13.3%), with a highly significant difference ($\chi^2 = 13.114$, $p < 0.001$). Similarly, the replacement of misfitted fixed partial restorations with active periodontal pockets was more frequent in males (100.0%) than in females (56.7%), also reaching a high level of statistical significance ($\chi^2 = 12.213$, $p < 0.001$). In contrast, the extraction of teeth with advanced mobility was significantly more common in females (56.7%) than in males (19.0%) ($\chi^2 = 7.217$, $p = 0.007$). Other treatment categories did not show statistically significant differences between sexes. Periodontal therapy was administered to all male patients (100.0%) and to 86.7% of female patients, without reaching statistical significance ($\chi^2 = 3.038$, $p = 0.134$). Endodontic-periodontal lesion treatments were slightly more frequent in females (26.7%) than in males (19.0%) ($\chi^2 = 0.399$, $p = 0.739$), and chronic periapical lesion endodontic treatments had similar frequencies in males (19.0%) and females (16.7%) ($\chi^2 = 0.048$, $p = 1.000$), both without statistically significant differences (Table 3).

The analysis of dental treatment categories by age group revealed several statistically significant differences. Extraction of root remnants was performed significantly more often in patients aged 50–65 years (70.9%) compared to those over 65 years (18.8%), with a highly significant difference ($\chi^2 = 87.434$, $p < 0.001$). Likewise, endodontic-periodontal lesion treatments were much more frequent

in the 50–65 age group (53.2%) than in patients over 65 (12.5%), also with a highly significant difference ($\chi^2 = 59.730$, $p < 0.001$). Replacement of misfitted fixed partial restorations with active periodontal pockets was more common in the 50–65 age group (89.9%) compared to the over 65 group (78.8%), a difference that was statistically significant ($\chi^2 = 7.423$, $p = 0.006$). The extraction of teeth with advanced mobility was more frequent in patients over 65 years (48.8%) compared to those aged 50–65 years (38.0%), but without reaching statistical significance ($\chi^2 = 3.758$, $p = 0.053$). Periodontal therapy was administered to all patients in the 50–65 age group (100.0%) and to 97.5% of those over 65, with no significant difference ($\chi^2 = 4.000$, $p = 0.123$). Chronic periapical lesion endodontic treatments were slightly more common in the 50–65 group (25.3%) compared to the over 65 group (18.8%), without statistical significance ($\chi^2 = 1.997$, $p = 0.158$) (Table 4).

The analysis of dental treatment categories by residence revealed several statistically significant differences. Chronic periapical lesion endodontic treatments were recorded exclusively in rural patients (57.4%), while no such treatments were reported in the urban group, a difference that was highly significant ($\chi^2 = 144.201$, $p < 0.001$). Endodontic-periodontal lesion treatments were more frequent among rural patients (49.2%) compared to urban ones (22.4%), also showing a highly significant difference ($\chi^2 = 24.414$, $p < 0.001$). Extraction of root remnants was more commonly performed in the urban group (52.0%) than in the rural group (32.8%), with a statistically significant difference ($\chi^2 = 11.279$, $p < 0.001$). The replacement of

misfitted fixed partial restorations with active periodontal pockets was more frequently observed in urban patients (91.8%) compared to rural ones (72.1%), and the difference was also statistically significant ($\chi^2 = 22.035$, $p < 0.001$). Periodontal therapy was administered to all urban patients (100.0%) and to 96.7% of rural patients, with a statistically significant difference ($\chi^2 = 6.508$, $p = 0.021$). The extraction of teeth with advanced mobility was slightly more frequent in urban areas (44.9%) than in rural areas (41.0%), but the difference did not reach statistical significance ($\chi^2 = 0.469$, $p = 0.493$) (Table 5).

The analysis of dental treatment categories by orthopedic diagnosis revealed several statistically significant differences. Chronic periapical lesion endodontic treatments were recorded exclusively in patients with hip osteoarthritis (42.9%), while no such treatments were reported in those with knee osteoarthritis. This difference was highly significant ($\chi^2 = 15.612$, $p < 0.001$). The replacement of misfitted fixed partial restorations with active periodontal pockets was more frequent in patients with knee osteoarthritis (86.7%) than in those with hip osteoarthritis (57.1%), also reaching statistical significance ($\chi^2 = 5.669$, $p = 0.017$). Periodontal therapy was administered to all patients with knee osteoarthritis (100.0%) and to 81.0% of those with hip osteoarthritis, a difference that was statistically significant as well ($\chi^2 = 6.201$, $p = 0.024$). Other treatment categories did not show statistically significant differences between the two diagnostic groups, although some trends were observed. Endodontic-periodontal lesion

treatments were more frequent in patients with hip osteoarthritis (38.1%) compared to those with knee osteoarthritis (13.3%) ($\chi^2 = 4.210$, $p = 0.051$), and the extraction of root remnants was more common in the knee osteoarthritis group (43.3%) than in the hip osteoarthritis group (19.0%) ($\chi^2 = 3.279$, $p = 0.070$). No significant difference was observed in the extraction of teeth with advanced mobility, which occurred in 42.9% of patients with hip osteoarthritis and 40.0% of those with knee osteoarthritis ($\chi^2 = 0.042$, $p = 0.838$) (Table 6).

The analysis of dental treatment categories according to the presence of systemic pathology affecting the postoperative phase revealed several statistically significant differences. Endodontic-periodontal lesion treatments were recorded exclusively in patients with systemic pathology (57.8%), while no such treatments were reported in patients without systemic conditions. This difference was highly significant ($\chi^2 = 118.482$, $p < 0.001$). The extraction of teeth with advanced mobility was performed significantly more often in patients with systemic pathology (60.0%) compared to those without (21.7%), also showing a highly significant difference ($\chi^2 = 46.552$, $p < 0.001$). The replacement of misfitted fixed partial restorations with active periodontal pockets was more frequent in patients with systemic pathology (88.9%) than in those without (78.3%), a difference that reached statistical significance ($\chi^2 = 6.659$, $p = 0.010$). Chronic periapical lesion endodontic treatments had similar frequencies in patients without (21.7%) and with systemic pathology (22.2%) ($\chi^2 = 0.011$, $p = 0.918$), and extraction of root remnants was slightly more common in the

group with systemic pathology (46.7%) than in the group without (42.0%) ($\chi^2 = 0.680$, $p = 0.410$). Periodontal therapy was administered to all patients without systemic conditions (100.0%) and to 97.8% of those with systemic pathology, without reaching statistical significance ($\chi^2 = 3.106$, $p = 0.136$) (Table 7).

The analysis of dental treatment categories according to smoking status revealed several statistically significant differences. Chronic periapical lesion endodontic treatments were significantly more frequent in smokers (41.7%) compared to non-smokers (13.5%), with a highly significant difference ($p < 0.001$). The extraction of root remnants was performed more often in smokers (70.8%) than in non-smokers (33.3%), also showing a highly significant difference ($p < 0.001$). The replacement of misfitted fixed partial restorations with active periodontal pockets was more frequent among smokers (100.0%) than among non-smokers (77.5%), with a statistically significant difference ($p < 0.001$). Extraction of teeth with advanced mobility was more common in non-smokers (49.5%) than in smokers (29.2%), and this difference was also statistically significant ($p < 0.001$). Endodontic-periodontal lesion treatments were more frequent in smokers (41.7%) compared to non-smokers (28.8%), with a significant difference ($p = 0.025$). Other treatment categories did not show statistically significant differences between the two groups. Periodontal therapy was administered to all smokers (100.0%) and to 98.2% of non-smokers, without reaching statistical significance ($p = 0.319$) (Table 8).

The analysis of dental treatments according to the OHI score revealed several statistically significant differences. Extraction of root remnants was performed significantly more often in patients with an OHI score of 2 (48.6%), reaching a high level of statistical significance ($p = 0.003$). Similarly, the replacement of misfitted fixed partial restorations with active periodontal pockets was more frequent in patients with an OHI score of 2 (85.7%) compared to those with a score of 1 (66.7%), also with high statistical significance ($p < 0.001$). Periodontal therapy was universally applied in both groups with OHI scores of 1 and 2 (100.0%), also with statistically significant association ($p < 0.001$), reflecting clinical protocol adherence. The extraction of teeth with advanced mobility was more common in patients with an OHI score of 1 (66.7%) compared to those with a score of 2 (37.1%), with statistical significance ($p = 0.044$). Endodontic treatments of chronic periapical lesions showed a trend toward association with poor oral hygiene, being observed in 25.7% of patients with OHI score 2, yet without reaching the threshold for statistical significance ($p = 0.082$). Treatments for endodontic-periodontal lesions were not significantly associated with OHI score ($p = 0.391$) (Table 9).

The analysis of dental treatment categories according to obesity status revealed several statistically significant differences. Extraction of root remnants was significantly more common in non-obese patients (100.0%) compared to obese patients (20.0%), with a highly significant association ($p < 0.001$). The replacement of misfitted fixed partial restorations with active periodontal pockets was significantly

more frequent in non-obese patients (100.0%) than in obese patients (77.3%) ($p < 0.001$). Endodontic treatments for chronic periapical lesions were performed considerably more often in non-obese individuals (40.8%) compared to obese individuals (13.6%), showing a strong statistical association ($p < 0.001$). Endodontic-periodontal lesion treatments

were more frequent among non-obese patients (40.8%) than obese ones (29.1%), with statistical significance ($\chi^2 p = 0.040$). Periodontal therapy was administered in nearly all cases, regardless of obesity status—100.0% in non-obese and 98.2% in obese patients—without statistical significance ($p = 0.316$) (Table 10).

Table 3. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: gender (males vs. females)

	Sex				Pearson Chi-squared test:	
	males		females		Chi2	p
	n	%	n	%		
CPL endodontic treatments	4	19.0%	5	16.7%	0.048	1.000
EPL treatments	4	19.0%	8	26.7%	0.399	0.739
Extraction of root remnants	13	61.9%	4	13.3%	13.114	<0.001**
Extraction of teeth with advanced mobility	4	19.0%	17	56.7%	7.217	0.007**
Periodontal therapy	21	100.0%	26	86.7%	3.038	0.134
Replacement of misfitted FPR with active PP	21	100.0%	17	56.7%	12.213	<0.001**
Total	21	100.0%	30	100.0%		

Table 4. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: age group (50-65 yrs. vs. > 65 yrs.)

	Age group				Pearson Chi-squared test:	
	50-65 yrs.		>65 yrs.		Chi2	p
	n	%	n	%		
CPL endodontic treatments	40	25.3%	30	18.8%	1.997	0.158
EPL treatments	84	53.2%	20	12.5%	59.730	<0.001**
Extraction of root remnants	112	70.9%	30	18.8%	87.434	<0.001**
Extraction of teeth with advanced mobility	60	38.0%	78	48.8%	3.758	0.053
Periodontal therapy	158	100.0%	156	97.5%	4.000	0.123
Replacement of misfitted FPR with active PP	142	89.9%	126	78.8%	7.423	0.006**
Total	158	100.0%	160	100.0%		

Table 5. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: residence (urban vs. rural)

	Residence		Pearson Chi-squared test:
	urban	rural	

	n	%	n	%	Chi2	p
CPL endodontic treatments	-	-	70	57.4%	144.201	<0.001**
EPL treatments	44	22.4%	60	49.2%	24.414	<0.001**
Extraction of root remnants	102	52.0%	40	32.8%	11.279	<0.001**
Extraction of teeth with advanced mobility	88	44.9%	50	41.0%	0.469	0.493
Periodontal therapy	196	100.0%	118	96.7%	6.508	0.021*
Replacement of misfitted FPR with active PP	180	91.8%	88	72.1%	22.035	<0.001**
Total	196	100.0%	122	100.0%		

Table 6. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: orthopedic diagnostic (urban vs. rural)

	Orthopedic diagnostic:				Pearson Chi-squared test:	
	Hip osteoarthritis		Knee osteoarthritis		Chi2	p
	n	%	n	%		
CPL endodontic treatments	9	42.9%	-	-	15.612	<0.001**
EPL treatments	8	38.1%	4	13.3%	4.210	0.051+
Extraction of root remnants	4	19.0%	13	43.3%	3.279	0.070+
Extraction of teeth with advanced mobility	9	42.9%	12	40.0%	0.042	0.838
Periodontal therapy	17	81.0%	30	100.0%	6.201	0.024+
Replacement of misfitted FPR with active PP	12	57.1%	26	86.7%	5.669	0.017*
Total	21	100.0%	30	100.0%		

Table 7. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: systemic pathology affecting postoperative phase

	Systemic pathology affecting postoperative phase				Pearson Chi-squared test:	
	No		Yes		Chi2	p
	n	%	n	%		
CPL endodontic treatments	30	21.7%	40	22.2%	0.011	0.918
EPL treatments	-	-	104	57.8%	118.482	<0.001**
Extraction of root remnants	58	42.0%	84	46.7%	0.680	0.410
Extraction of teeth with advanced mobility	30	21.7%	108	60.0%	46.552	<0.001**
Periodontal therapy	138	100.0%	176	97.8%	3.106	0.078
Replacement of misfitted FPR with active PP	108	78.3%	160	88.9%	6.659	0.010*
Total	138	100.0%	180	100.0%		

Table 8. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: smoking

	Smoking				Pearson Chi-squared test:	
	No		Yes		Chi2	p
	n	%	n	%		
CPL endodontic treatments	30	13.5%	40	41.7%	30.943	<0.001**
EPL treatments	64	28.8%	40	41.7%	5.019	0.025*

Extraction of root remnants	74	33.3%	68	70.8%	38.134	<0.001**
Extraction of teeth with advanced mobility	110	49.5%	28	29.2%	11.335	<0.001**
Periodontal therapy	218	98.2%	96	100.0%	1.752	0.319
Replacement of misfitted FPR with active PP	172	77.5%	96	100.0%	25.656	<0.001**
Total	222	100.0%	96	100.0%		

Table 9. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: OHI index

	OHI						Pearson Chi-squared test:	
	0		1		2		Chi2	p
	n	%	n	%	n	%		
CPL endodontic treatments	-	-	-	-	9	25.7%	4.996	0.082+
EPL treatments	-	-	4	33.3%	8	22.9%	1.881	0.391
Extraction of root remnants	-	-	-	-	17	48.6%	11.657	0.003**
Extraction of teeth with advanced mobility	-	-	8	66.7%	13	37.1%	6.254	0.044*
Periodontal therapy	-	-	12	100.0%	35	100.0%	51.000	<0.001**
Replacement of misfitted FPR with active PP	-	-	8	66.7%	30	85.7%	14.394	<0.001**
Total	4	100.0%	12	100.0%	35	100.0%		

Table 10. Dental treatment for removal of oral infectious sources in patients scheduled for hip/knee arthroplasty: obesity

	Obesity				Pearson Chi-squared test:	
	No		Yes		Chi2	p
	n	%	n	%		
CPL endodontic treatments	40	40.8%	30	13.6%	29.176	<0.001**
EPL treatments	40	40.8%	64	29.1%	4.235	0.040*
Extraction of root remnants	98	100.0%	44	20.0%	175.572	<0.001**
Extraction of teeth with advanced mobility	-	-	138	62.7%	108.602	<0.001**
Periodontal therapy	98	100.0%	216	98.2%	1.805	0.316
Replacement of misfitted FPR with active PP	98	100.0%	170	77.3%	26.428	<0.001**
Total	98	100.0%	220	100.0%		

DISCUSSIONS

In patients scheduled for hip or knee arthroplasty, the presence of untreated odontogenic infections represents a potential risk for the development of

periprosthetic joint infections. The dissemination of oral infections through anatomical pathways may lead to systemic complications, particularly if not adequately managed before surgery. A thorough understanding of the infection

pathways, associated risk factors, and the microbiological profile of oral infectious foci is essential for establishing effective preoperative screening and treatment protocols aimed at minimizing the risk of postoperative complications [14].

In our study, we aimed to investigate the need for dental treatment specially aiming the removal of all oral infectious sources in patients scheduled for hip and knee arthroplasty, in relation to various sociodemographic, local and individual parameters.

Male patients required more frequent removal of infectious sources through the extraction of root remnants and replacement of misfitted restorations, indicating a higher burden of untreated or improperly treated dental conditions. Conversely, female patients showed a greater need for extraction of teeth with advanced mobility, suggesting a later-stage progression of periodontal disease. Patients aged 50–65 years presented a significantly higher demand for endodontic and restorative interventions, reflecting an active phase of managing chronic oral infections.

In contrast, older patients (65+) showed a tendency toward irreversible treatments like tooth extraction, which may reflect cumulative oral deterioration and limited therapeutic alternatives. Rural patients exhibited a higher prevalence of chronic periapical and endodontic-periodontal lesions, highlighting unmet needs in infection control and access to timely endodontic care. Urban patients were more often treated with prosthetic replacements and periodontal therapy, possibly reflecting better access to comprehensive dental care and preventive protocols.

Our study is justified by case-control studies with patients scheduled for hip arthroplasty reported PJIs were associated with both non-invasive procedures (i.e. dental scaling and polishing) and invasive procedures (such as dental extraction) [20-25].

Regarding the interpretation of results related to orthopedic diagnostic, patients with hip osteoarthritis required significantly more endodontic treatment for chronic periapical lesions, suggesting a possible neglect of latent oral infections prior to referral for prosthetic surgery. In contrast, patients with knee osteoarthritis more frequently benefited from prosthetic restoration replacement and periodontal therapy, reflecting a higher engagement with pre-prosthetic dental optimization protocols.

Patients with systemic comorbidities affecting postoperative evolution presented a markedly higher need for the extraction of teeth with advanced mobility and for endodontic-periodontal lesion treatment, indicating increased oral infectious risk prior to surgery.

The greater frequency of prosthetic restoration replacement in this group further supports the need for comprehensive dental sanitation measures in medically vulnerable individuals. A research proved that most patients scheduled for hip or knee arthroplasty had low levels of oral hygiene indices associated to periodontal disease in The group evaluated 137 patients allocated for hip replacement and 91 patients allocated for knee replacement finding clinically relevant diseases in 28.5% of patients [26]. Patients with PJI after hip and knee

arthroplasty presenting comorbidities, such as diabetes or rheumatoid arthritis, can reach up to 56% in study groups [26].

Smokers showed a higher need for endodontic treatments and corrective prosthetic interventions, suggesting a greater prevalence of chronic oral infections and defective restorations in this group. In contrast, the extraction of teeth with advanced mobility was more frequent among non-smokers, which may reflect earlier detection and different therapeutic approaches depending on smoking status.

Patients with poor oral hygiene (OHI = 2) required more frequent extractions and prosthetic correction procedures, highlighting the direct link between inadequate oral hygiene and the accumulation of infectious sources. Additionally, the uniform application of periodontal therapy in both groups indicates adherence to a standardized decontamination protocol prior to prosthetic treatment, regardless of initial hygiene status. A research proved that most patients scheduled for hip or knee arthroplasty had low levels of oral hygiene indices associated to periodontal disease in The group evaluated 137 patients allocated for hip replacement and 91 patients allocated for knee replacement finding clinically relevant diseases in 28.5% of patients. All patients eligible for hip or knee arthroplasty had periodontal disease and poor oral hygiene [27].

Obese patients exhibited a lower frequency of endodontic treatments and root remnant extractions, which may suggest a more limited therapeutic approach or delayed dental care in the context of systemic comorbidities. In contrast, non-obese patients more often

received complex treatments and restorative interventions, reflecting a greater therapeutic engagement and possibly better systemic control.

Oral pathology has been reported in 12–23% of patients awaiting hip or knee arthroplasty [28, 29]. A higher prevalence, ranging from 30% to 50%, has been observed among the elderly population in the United States [28]. Untreated dental caries appear to be more frequent in specific subgroups, including institutionalized elderly individuals, smokers, frequent consumers of carbonated beverages, patients with diabetes, and those from lower socioeconomic backgrounds. The removal of dental infection sources may be necessary only for a more select group of patients, advocating for their identification through a preoperative screening questionnaire prior to joint replacement surgery [29]. This research group found that 12% of patients required dental extractions or endodontic treatment, while 19% also needed caries management. The same research group identified several risk factors for infectious oral sources: advanced age (with 30–50% of older adults presenting dental disease and a higher susceptibility to infection), smoking (associated with increased risk of caries, endodontic treatment, and extractions due to active infections), a history of treated dental conditions (such as extractions or poor hygiene), lack of daily dental floss use, and infrequent or absent dental visits within the previous year [29].

Although awareness of the need to prevent periprosthetic joint infection (PJI) has increased, a significant reduction in its prevalence has yet to be achieved, despite a decline in PJI-related mortality [30]. To

effectively reduce the incidence of PJI, thorough preoperative screening of patients is essential, and postoperative sepsis prophylaxis must address the identification and management of distant infection sources, including oral infections [31]. In response, health authorities and international organizations have underscored the importance of oral health as a fundamental component of general well-being, advocating for the integration of dental care within broader healthcare frameworks [32]. However, several barriers hinder this integration, such as fragmented care models, unclear allocation of responsibilities, insufficient awareness, and low prioritization of oral health by both providers and patients [33].

These results and high prevalence of oral infectious sites, also demonstrated by our study, highlight the need for comprehensive preoperative dental screening and, if necessary, the removal of all oral infectious sources to reduce the risk of postoperative infectious complications. This situation underscores the importance of interdisciplinary collaboration, and ensure timely referral to dental professionals, potentially reducing the risk of periprosthetic joint infection following arthroplasty.

CONCLUSIONS

- Endodontic and periodontal pathologies were frequently identified as major sources of oral infection in patients scheduled for arthroplasty, highlighting the

significant burden of undiagnosed or untreated dental disease. Additionally, misfitted fixed prosthetic restorations associated with active periodontal pockets were commonly observed, emphasizing the need for comprehensive oral health assessment and targeted dental interventions before orthopedic surgery.

- The need for dental treatments targeting the elimination of oral infectious sources in patients awaiting hip or knee arthroplasty is significantly influenced by sociodemographic and systemic factors. Variables such as male sex, rural residence, smoking, and the presence of systemic comorbidities were associated with a higher prevalence of untreated infections, underscoring the importance of individualized dental screening and intervention protocols prior to orthopedic surgery.
- Differences observed across age groups, obesity status, and type of orthopedic diagnosis suggest that early, tailored dental management is essential to reduce infection risks in arthroplasty candidates. The implementation of standardized preoperative dental protocols, especially in medically vulnerable and socioeconomically disadvantaged populations, may enhance surgical outcomes and reduce postoperative complications.

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