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Total Joint Arthroplasty: Should Patients Have Preoperative Dental Clearance?

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ABSTRACT

Obtaining dental clearance prior to elective total joint arthroplasty is a common practice; however, little published data exist to justify this requirement. Dental clearance data for 365 elective total knee and total hip arthroplasty patients were gathered prospectively. Of these patients, 358 (average age of 62.4 years; 157 men and 201 women; 152 primary total knee arthroplasties (TKAs), 16 revision TKA arthroplasties, one conversion TKA, 168 primary total hip (THAs) arthroplasties and 21 revision THA arthroplasties) proceeded to surgery and follow-up data were available for 355. A comparison group of 218 hip fracture patients (average age of 78.7 years; 52 men and 109 women; 137 THA and 81 hemiarthroplasties) with no preoperative dental clearance who were treated with hip arthroplasty was extracted retrospectively from an institutional database. Follow-up data were available for 161 of these patients. The incidence of dental pathology in the elective arthroplasty group was 8.8%. Early postoperative infection requiring surgical treatment occurred in six patients (1.7%) in the dental clearance elective arthroplasty group and in four patients (2.5%) in the hip fracture arthroplasty group. No statistical difference was found between the two groups. This suggests that the perceived need for routine preoperative dental screening for all hip and knee arthroplasty patients should be reassessed.

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Periprosthetic joint infection (PJI) is a devastating complication of total joint arthroplasty (TJA) resulting in significant patient morbidity. The incidence of this devastating complication seems to be on the rise [1]. The economic impact of a single case can easily exceed $50,000 [2]. Dental sources of infection have been reported sporadically in arthroplasty patients [3–11]. The implication of a dental source in these reports of PJI is based upon (i) the identification of a pathogen at the infection site that is regarded as part of the usual oral flora and/or (ii) the association of the timing of the infection with a dental procedure. Such reports have been used to justify the use of dental prophylaxis in arthroplasty patients prior to dental procedures. By extension, it has been recommended that patients contemplating TJA undergo a preoperative dental clearance [12,13]. Consequently, preoperative dental clearance is a prerequisite for elective hip or knee arthroplasty at our institution and is a common standard in arthroplasty practice [12,13]. This practice standard is implemented with the goal of minimizing the risk of postoperative infection by eliminating potential dental sources of infection preoperatively. While the goal of minimizing infection is desirable, there are essentially no data in the orthopaedic literature regarding the efficacy of dental clearance prior to hip or knee arthropasty. A recent unpublished report found 23 of 100 patients to have active dental decay requiring treatment prior to proceeding with TJA [14]. Otherwise, little has been reported regarding the prevalence of dental problems in these patients and what effect dental clearance has upon the preoperative preparation of these patients as well as their postoperative risk of PJI. We decided to evaluate our arthroplasty patient population to determine the prevalence of preoperative dental issues in these patients and investigate any relevance of this to early postoperative infection.

Methods

The dental clearance histories of 365 patients seen in the office between June 22, 2010, and August 13, 2010, and subsequently scheduled to have an elective TJA (knee or hip; primary or revision) were collected. At our institution, dental clearance requires an evaluation by a dental professional with any required dental intervention being performed prior to arthroplasty surgery. The dental professional provides a written clearance that the patient has no active dental infection and that the patient is cleared for arthroplasty surgery from a dental perspective. This clearance is required for all elective arthroplasty patients, regardless of their dental symptoms. The only exceptions to this requirement are patients with a complete set of dentures. Seven of the 365 patients could not obtain dental clearance and therefore never underwent surgery. The remaining 358 patients underwent surgery and were interviewed on their first or second postoperative day. A trained interviewer elicited a four-question survey

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concerning the patient's preoperative dental clearance. The survey asked: (i) Prior to your joint surgery did you receive dental clearance? (ii) At the time of your dental clearance, did you have any dental issues that required dental work prior to your joint surgery; and if so, what were these dental issues? (iii) Did any dental issues require you to delay or cancel your surgery; and if so, what were these dental issues? (iv) Do you wear dentures? The survey also obtained the name of the patient's dentist and the date of the patient's dental examination. The survey was done to confirm the preoperative dental clearance information already obtained as well as clarify the extent of the dental work performed. Although all patients were cleared by their dentists, details of specific dental problems were rarely reported on preoperative clearance notes from dentists. All arthroplasty surgeries were performed by one of six surgeons at the same institution using standard antibiotic prophylaxis and standard postoperative protocols. The average age of the elective arthroplasty patients was 62.4 years (range 16 to 88 years). There were 157 men and 201 women. The surgeries included 169 total knee arthroplasty (TKA) surgeries with 152 primary arthroplasties, 16 revision arthroplasties, and one conversion of a previous surgery to an arthroplasty. There were 189 total hip arthroplasty (THA) surgeries performed with 168 primary arthroplasties and 21 revision arthroplasties. Postoperatively, patients underwent routine evaluation with an initial follow-up appointment within the first six weeks of surgery and an additional follow-up appointment within the first year of surgery. No follow-up was available for three patients: two were lost to follow-up and one died on postoperative day 8. The remaining 355 patients were followed prospectively by review of office notes, hospital re-admission records, and phone calls to identify the occurrence of PJI. For these 355 patients, the average length of follow-up was 7.6 months (range 0.3 to 14.6 months) with follow-up of > 6 months in 305 patients (85%).

Since all patients undergoing elective TJA at our institution received preoperative dental clearance, we selected a comparison group consisting of 218 patients who underwent either total hip arthroplasty or hemi-arthroplasty for treatment of a hip fracture between January, 2000, and March, 2010. These patients were identified from our institutional database. No preoperative dental clearance was obtained for these patients. The surgeries performed in this group included 137 total hip arthroplasties and 81 hemiarthroplasties. No follow-up data were available for 57 patients: 18 (8%) were lost to follow-up and 39 (18%) were deceased with no follow-up data available. Of the 39 deceased patients, 17 had died within 6 months postoperatively and did not have any documentation of postoperative infection (average time to death: 68 days, range: 10 to 166 days). For the remaining 161 (74%) patients with follow-up, the average length of follow-up was 2.4 years (range: 3 months to 10.8 years) with follow-up of > 6 months available for 122 patients (56%). The average age of this comparison arthroplasty group was 78.7 years (range 42 to 101 years) and included 52 men and 109 women. Information regarding the occurrence of PJI in these patients was obtained from a retrospective analysis of available patient records including office notes and hospital re-admission records.

PJI was defined using the MSIS criteria for diagnosis of infection [Parvizi, 2011 #20]. Patients were considered infected if they had a sinus tract communicating with the prosthetic joint, two positive cultures from separate samples, or four of the following criteria: (1) elevated erythrocyte sedimentation rate (ESR) or C-reactive protein (CRP), (2) elevated synovial white blood cell count (WBC), (3) elevated synovial neutrophil differential (PMN%), (4) presence of purulence in the joint, (5) one positive culture. Histologic analysis of tissue samples is not performed at our institution and therefore not utilized as part of the criteria.

Statistics

Statistical analyses were performed using SPSS version 20 (IBM, Armonk, NY, USA). Chi squared analyses were used to compare categorical variables, and student's t-test was used to compare continuous variables between the elective TJA cases that had dental clearance and hip fracture cases without dental clearance. A comparison of demographics and comorbidity index of patients in both groups can be seen in Table 1. Statistical significance was set at a *P* value of less than 0.05.

Results

Of the 365 patients scheduled to have elective surgery, 32 (8.8%) patients had periodontal disease that needed to be treated prior to their joint arthroplasty surgery. Of these 32 patients, 7 patients never obtained dental clearance and so never underwent surgery. The remaining 25 patients were able to treat their periodontal disease and proceed to surgery. 305 (84%) patients were dentally cleared and reported having no periodontal disease that needed to be addressed prior to surgery. Of the remaining patients, 22 (6.0%) patients wore a full set of dentures and were exempted from being seen by a dentist preoperatively. Six (1.6%) patients never saw a dentist prior to surgery, but still proceeded with having their joint arthroplasty surgery. Overall, the prevalence of periodontal concerns requiring treatment prior to total joint arthroplasty in our patient sample was 8.8%.

For the 356 patients in the dental clearance group for whom follow-up data were available, six patients required surgical treatment for a suspected postoperative infection (see Table 2). All six infections were identified within six months of the surgery (average time 68.5 days; range 36 to 166 days). A pathogen was identified in five of the six cases. The only culture negative case was concerning enough for infection that the patient underwent a resection arthroplasty. Only one of these six patients had preoperative dental issues requiring treatment prior to surgery. All six cases involved a primary arthroplasty (3 TKA, 3 THA).

For the 161 patients in the hip fracture comparison group for whom follow-up data were available, four patients (2.5%) required surgical treatment for a suspected postoperative infection (see Table 3). The four infections were identified within one month of the surgery (average time 16 days; range 9 to 28 days). A pathogen was identified in only one of the four cases in a blood culture taken 3 months after resection arthroplasty, which may or may not have been associated with the original periprosthetic joint infection. The indication for the surgery in the other three cases was persistent postoperative drainage. Surgery in these three cases was performed for suspected infection, but no definite infection was identified clinically.

Comparing the two groups, the overall rate of early (less than six months) infection was 1.7% in the dental clearance elective arthroplasty group and 2.5% in the hip fracture comparison group. The difference between the two groups with regard to the number of cases of early postoperative PJI did not reach statistical significance ($P = 0.512$; Fisher exact test). Furthermore the pathogens from the infections in both groups, with perhaps the exception of the *Peptostreptococcus magnus*

Table 1
Comparison of Demographics of Elective TJA Patients With Dental Clearance and Hip Fracture Patients Undergoing THA Without Dental Clearance.

Variable	Dental Clearance (n = 358 Patients)	No Dental Clearance (n = 161 Patients)	*P* Value
Age (years)	62.4 (95% CI; 61.1–63.7)	78.7 (95% CI; 77.0–80.4)	<0.001
Gender			0.017
Male	157	52	
Female	201	109	
BMI (kg/m^2)	30.6 (95% CI; 29.9–31.3)	24.0 (95% CI; 23.0–25.0)	0.226
Charlson Comorbidity Index	2.0 (95% CI; 1.9–2.1)	3.7 (95% CI; 3.4–4.0)	<0.001

CI: Confidence Interval.

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