OPTIMIZING ORTHOPEDIC OUTCOMES: THE CRUCIAL ROLE OF PREOPERATIVE DENTAL ASSESSMENT IN HIP AND KNEE ARTHROPLASTY - NARRATIVE REVIEW

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ABSTRACT

Introduction: In the context of orthopedic surgery, particularly knee and hip replacements, the role of dental health often goes unnoticed. This literature review explores the significance of dental clearance prior to knee and hip arthroplasty, highlighting the role of preoperative dental evaluation in reducing the risk of Periprosthetic Joint Infections (PJI). **Materials and Methods:** The review involved a comprehensive examination of various studies and reports discussing the prevalence of dental pathology in patients requiring joint arthroplasty and the risk factors for PJIs. Additionally, it included the development of a patient selection algorithm and a questionnaire designed to identify individuals at higher risk of dental-related complications. **Results and Discussions:** This section would discuss the findings of the literature review, particularly focusing on the effectiveness of preoperative dental clearance in mitigating the risks of PJIs. It would also analyze the results obtained from the application of the patient selection algorithm and questionnaire, emphasizing their role in streamlining the preoperative evaluation process. **Conclusions:** The review concludes by emphasizing the necessity of comprehensive oral health evaluations for patients undergoing hip and knee arthroplasty, especially for those with multiple comorbidities or at higher risk of dental infections. The importance of integrating dental assessments into the perioperative management of joint arthroplasty patients is also highlighted.

Keywords: Dental Clearance, Hip Arthroplasty, Knee Arthroplasty, Periprosthetic Joint Infection, Preoperative Dental Evaluation, Oral Health, Geriatric Patients, Risk Factors, Patient Selection Algorithm.

INTRODUCTION

Total arthroplasty of major joints (hip and knee) has proven its effectiveness over time in restoring the functionality of the joint, becoming a frequent surgical intervention due to the increase in the number of people with advanced degenerative changes. Periprosthetic infection (PJI) is one of the most dreaded complications of joint prosthetics, causing high morbidity and mortality. It affects 1-2% of all total joint arthroplasties, while also having a significant financial impact for their treatment [1]. The incidence of PJI is highest in the first two years postoperatively [2], with knee arthroplasty having a significantly higher risk (0.5%-2%) [3,4,5] than hip arthroplasty (0.5%-1%) [2,3,6]. Therefore, special importance is given to the prevention of PJI, ranging from perioperative medical treatment, antibiotic prophylaxis to preoperative patient preparation [7].

Risk factors involved in the occurrence of PJI include septic or aseptic revision arthroplasty, tobacco abuse, obesity, rheumatoid arthritis, neoplasm, immunosuppression, and diabetes mellitus [8-11]. Postoperative risk factors include poor wound healing (superficial infection, hematoma, necrosis, and wound dehiscence), atrial fibrillation, myocardial infarction, urinary tract infection, prolonged hospitalization, and Staphylococcus aureus bacteremia [8-18]. To reduce the risk of PJI, patients are preoperatively evaluated, with the identification and treatment of distant infections (acute oral, skin, respiratory, gastrointestinal, and urogenital infections) having an overwhelming impact on postoperative septic complications [19-21].

Studies in the literature provide controversial data regarding the involvement of dental pathogens in the occurrence of PJI, with incidence varying from 0.03%-0.04% [22,23] to 6%-13% [7,24-26]. Discussions on the relationship between bacteremia caused by dental procedures and subsequent PJIs continue, and it is considered opportune for orthopedic physicians to request a preoperative dental evaluation. However, this practice imposes significant financial costs and other negative implications for the patient. This fact, added to the lack of clear evidence regarding the dental pathology that can cause periprosthetic infections, raises the question of dental infection. This necessitates a primary medical evaluation by the orthopedic physician who, upon identifying risk factors, may request a comprehensive dental evaluation.

MATERIAL AND METHODS

In this study, a thorough narrative review of specialized literature was conducted to assess the necessity of preoperative dental screening in the context of hip and knee arthroplasty. This involved analyzing studies and reports detailing the relationship between preoperative dental health and the incidence of periprosthetic joint infections. Building on these insights, a comprehensive questionnaire was created to identify general and dental risk factors. Additionally, a preoperative algorithm was developed, inspired by existing methodologies, to optimize the evaluation process of patients prior to undergoing hip and knee arthroplasty procedures.

RESULTS AND DISCUSSIONS

The Growing Importance of Oral Health in Perioperative Management

Over the past two decades, the significance of oral health in perioperative care has increasingly been recognized, especially for patients undergoing joint arthroplasty procedures such as total hip (THA) and knee (TKA) replacements. This trend reflects a broader understanding of how oral health impacts overall health and the specific challenges faced in surgical contexts.

The demographic most affected by joint arthroplasty procedures tends to be older adults, with the average age of patients undergoing THA and TKA around 67 years (American Joint Replacement Registry AJRR, 2019) [27]. In this age group, the prevalence of oral health issues is notably high, making dental care a critical aspect of preoperative evaluation and management [28]. The concern extends to economically disadvantaged and minority groups, who often face barriers in

accessing routine dental care [29]. These barriers can lead to a higher incidence of oral health problems, which, if unaddressed, can complicate surgical outcomes.

Oral health conditions, particularly periodontal disease, have been linked to systemic health issues such as diabetes, which can further complicate perioperative management [30]. This interrelation underscores the necessity of comprehensive preoperative assessments that include dental evaluations. The U.S. Department of Health and Human Services emphasizes the importance of oral health as a key factor in overall health, supporting the integration of dental care into general health care practices [31].

In the context of joint arthroplasty, the risk of postoperative infections is a significant concern. Studies have shown that bacteremia resulting from oral infections can lead to postoperative complications, including infections at the surgical site [32,33]. Routine dental procedures, such as tooth brushing or dental flossing, can also introduce bacteria into the bloodstream, potentially leading to bacteremia and increasing the risk of infection in prosthetic joints [34,35].

To mitigate these risks, preoperative dental assessments are recommended. Research of Barrere et al. indicates that dental evaluations prior to orthopedic surgery can significantly reduce the incidence of postoperative joint infections [36]. Additionally, studies have identified dental procedures as potential risk factors for prosthetic hip or knee infections, highlighting the need for careful management of dental issues both before and after joint arthroplasty [37,38].

The growing awareness of the importance of oral health in perioperative management reflects an evolving understanding of the interconnectedness of oral and overall health. For patients undergoing joint arthroplasty, comprehensive dental evaluations and management are essential to minimize the risk of postoperative complications and ensure optimal surgical outcomes. As the population ages and the prevalence of joint replacement surgeries increases, the integration of oral health care into perioperative management protocols will become increasingly vital.

Oral Health and Systemic Implications

Oral health is a multifaceted aspect of overall well-being, extending beyond just teeth to include gums, mucosal linings, salivary glands, and other oral tissues. In recent years, the biomedical field has made significant advancements in improving oral healthcare in the United States. However, disparities in access and quality of care persist, especially affecting vulnerable groups such as the elderly and economically disadvantaged (U.S. Department of Health and Human Services, 2000) [31].

One of the major concerns in oral health is chronic periodontal disease, which has been linked to systemic conditions such as diabetes. Periodontal disease can exacerbate glucose control in diabetic patients, complicating their overall health management [30]. This relationship between oral health and systemic diseases underscores the importance of comprehensive oral care, especially for those with chronic conditions.

The elderly population, which often struggles with both systemic health issues

and access to dental care, is particularly susceptible to the adverse effects of poor oral health. Raphael et al. (2017) noted that aging is a significant factor in the decline of oral health, with older adults facing increased risks of dental caries, tooth loss, and periodontal diseases [29]. These conditions not only affect their quality of life but can also have broader implications for their systemic health.

In addition to diabetes, periodontal disease has been associated with an increased risk of prosthetic joint infection (PJI) in patients undergoing joint replacements. The American Joint Replacement Registry (AJRR) reported in 2019 that proper oral health management is crucial for individuals undergoing orthopedic surgeries, such as hip and knee replacements, to minimize the risk of PJI [27].

The link between oral health and systemic infections is further highlighted by studies that have shown routine dental procedures can introduce bacteria into the bloodstream. This bacteremia can lead to postoperative infections in patients with prosthetic joints [32,33]. Even daily activities such as tooth brushing or dental flossing can pose risks for bacteremia, emphasizing the need for vigilant oral hygiene practices [34,35].

Given these risks, preoperative dental assessments have become a key recommendation for patients scheduled for orthopedic surgeries. Barrere et al. conducted a systematic review, concluding that dental evaluations prior to orthopedic procedures significantly reduce the risk of postoperative complications [36]. Similarly, Berbari et al. (2010) and Skaar et al. (2011) found that dental procedures can be risk factors for prosthetic joint infections, underscoring the need for careful management of oral health in these patients [37,38].

In conclusion, the systemic implications of oral health are vast and multifaceted. The relationship between oral conditions and systemic diseases, such as diabetes and PJI, highlights the necessity of integrating oral health care into the broader spectrum of healthcare, especially for vulnerable populations like the elderly and economically disadvantaged. Ensuring equitable access to oral healthcare and emphasizing its importance in overall health management are crucial steps towards improving both oral and systemic health outcomes.

Oral Cavity as a Source of Systemic Infection

The oral cavity is increasingly recognized as a potential source of systemic infections, particularly in the context of orthopedic surgeries. Blomgren et al. (1980) highlighted the concern for orthopedic surgeons regarding the potential for infections originating in the oral cavity to precipitate systemic infections, leading to prosthetic joint infections (PJIs).

This risk is notably higher in the geriatric population undergoing total hip arthroplasty (THA) and total knee arthroplasty (TKA), as identified by Waldman BJ et al. (1997). They found that older adults are more susceptible to dental issues like xerostomia, mucosal ulceration, fungal infections, and gingival recession, which can increase the risk of systemic infections.

The broader implications of oral health on systemic health have been well documented. The U.S. Department of Health and Human Services (2000) in their report "Oral Health in America"

emphasized the importance of oral health as a key component of overall health. This report shed light on the interconnectedness of oral health with general health, stressing the need for comprehensive healthcare that includes oral health, especially for vulnerable populations.

Furthermore, Raphael C. (2017) in "Oral health and aging" discussed the particular challenges faced by the elderly in maintaining oral health. The prevalence of dental caries, tooth loss, and other oral health issues in this demographic can have significant systemic consequences, impacting the success of surgeries like THA and TKA.

The American Joint Replacement Registry (AJRR) in their 2019 report also underscored the significance of maintaining good oral health in the context of orthopedic surgeries. According to their findings, patients with poor oral health are at an increased risk of developing PJIs, which can have serious implications for the success of joint arthroplasty procedures.

In the realm of diabetes, a condition prevalent in the elderly, Mealey BL et al. (2006) found that chronic periodontal disease can worsen glucose control, complicating diabetes management and increasing the risk of systemic complications. This further exemplifies the systemic impact of oral health issues.

Routine dental procedures, such as tooth brushing or flossing, can also introduce bacteria into the bloodstream, leading to bacteremia. Hartzell JD et al. (2005) and Crasta K et al. (2009) have shown that these everyday activities can pose a risk for systemic infection, particularly in individuals with existing health issues or those undergoing invasive procedures like joint replacements.

Preoperative dental assessments have been advocated as a means to reduce the risk of postoperative complications. Barrere S et al. (2019) conducted a systematic review and concluded that dental evaluations prior to orthopedic surgery can significantly reduce the incidence of postoperative joint infections.

Moreover, Berbari EF et al. (2010) and Skaar DD et al. (2011) have identified dental procedures as risk factors for prosthetic hip or knee infections. Their findings suggest that careful management of oral health before and after orthopedic surgeries is crucial for preventing PJIs.

In conclusion, the oral cavity plays a critical role in systemic health, particularly in the context of orthopedic surgeries. The evidence from various studies underscores the need for comprehensive oral health care and preoperative dental assessments to minimize the risk of systemic infections and ensure the success of procedures like THA and TKA.

Preoperative Dental Assessments in Orthopedic Surgery

The importance of preoperative dental evaluations in orthopedic surgery cannot be overstated. A multidisciplinary approach, involving careful examination for active infections at remote sites, is crucial [36]. While there is no standardized protocol for dental assessment before THA or TKA, the benefits of such evaluations are increasingly recognized. However, the impact of these practices on PJI rates is not well-established. Notably, many dentists advocate for peri-operative dental evaluations, citing their potential in optimizing patient outcomes and minimizing preventable complications.

Despite the recognized importance of oral health in perioperative management, the orthopedic literature is limited, primarily comprising case reports [39-50] and small series. Some case-control studies have attempted to investigate the relationship between oral bacteremia and PJIs, but a causal link is yet to be established. For instance, studies have shown no increased risk of PJI for patients undergoing dental procedures without antibiotic prophylaxis compared to those who did not undergo any dental procedure [38]. Two studies have documented dental pathology in 12 to 23% of patients intending to undergo hip or knee arthroplasty [51,52]. Other reports indicate a prevalence of dental pathology between 30 and 50% in the elderly patients in the United States [26,51], with 23% of adults having untreated cavities, the incidence being higher in certain groups such as institutionalized elderly, smokers, consumers of carbonated beverages, patients with chronic conditions like diabetes or rheumatic diseases, and those at a lower socioeconomic level.

The connection between oral health and PJIs in arthroplasty patients underscores the need for a comprehensive approach to perioperative management. While the evidence directly linking poor oral health to increased PJI rates is not definitive, the potential risk warrants serious consideration. Improving access to dental care, especially for vulnerable populations, and integrating routine dental evaluations into the perioperative protocol for arthroplasty patients, could play a significant role in reducing the incidence of these serious infections.

A preventative measure that is the subject of much debate is the utility of preoperative dental screening. In the study by Tokarski et al., it was suggested that the need for dental clearance could be limited to a smaller percentage of patients identified using a preoperative questionnaire [52]. They found that 12% did not pass the dental evaluation, which in this case was defined as the need for a dental extraction or root canal treatment. The number increases to 19% when including patients who require fillings. The same study identified six risk factors that could lead to an unfavorable dental consultation and compared them with specialized literature:

1. Advanced age: 30-50% of the geriatric patients have various dental conditions and present a high risk of dental infections [26,51,52].

2. Smoking: Tobacco users have an increased risk of dental caries and are likely to require treatment for active infection as part of dental care. Considering this data, patients who admit to tobacco use should be considered at higher risk of active dental infection and preoperative dental screening is indicated [52,53,54].

3. Narcotic use [52]

4. A history of treated dental pathology with teeth extraction and poor dental hygiene [52]

5. Not using dental floss at least once a day [52]

6. Infrequent dental visits [52].

At the same time, they observed that patients with one of the three key risk factors (narcotic use, tobacco use, and last dental visit more than a year ago) had a 22% chance of failing the dental evaluation, compared to 6% if they had no factors [52].

The study by Adamkiewicz et al. tracked preoperative dental evaluations of 228 patients admitted for Total Joint

Arthroplasty (TJA). They found that 28.5% had clinically significant periodontal disease. [55]

In the study by Vuorinen et al., the authors present the results of a prospective study on 952 patients scheduled for elective arthroplasty. Patients completed a questionnaire on potential risk factors for dental infections, and dentists documented the oral health of the patients and interventions performed (data available for 731 patients). As a result, 29.4% of patients did not receive dental clearance without specific treatment. 4.4% required root canal interventions, and 5.1% had severe periodontitis. The study found that the only significant risk factors for failing dental clearance were a history of root canal treatment, dental visit for symptoms in the last three months, rare dental check-ups, and tobacco use. Patients with regular examinations and no history of root canal treatment had a 50% lower chance of failing the dental assessment [56].

Barrington and Barrington tracked 100 patients who received dental evaluations and appropriate interventions before elective TJA [51]. Twenty-three percent proved to have active cavities requiring treatment.

In a 2014 study, Lampley et al. compared the incidence of postoperative infections between patients requiring elective total hip arthroplasty and those with hemiarthroplasty for femoral neck fracture. Patients in the elective arthroplasty subgroup underwent preoperative dental evaluation (8.8% requiring treatment for periodontal disease) compared to the traumatic subgroup [57]. The authors observed that there was no significant difference in the incidence of postoperative infections between the two subgroups.

Tai et al. used retrospective data from the National Health Insurance Research Database to track 6295 patients with total knee arthroplasty. The study highlighted that periodic dental evaluation and tartar removal were associated with significantly lower rates (31%) of postoperative infection [58].

Barrera et al. conducted a systematic review on preoperative dental clearance. In the reviewed studies, preoperative dental evaluation is not well documented, and if present, it primarily targeted periodontitis and dental abscesses. Although cohort studies have revealed a slightly lower proportion of Periprosthetic Joint Infections (PJIs) in patients who underwent preoperative dental evaluation, this result is difficult to confirm, as there are very few studies on these infections that mention preoperative dental evaluation. The authors of the study showed a relationship between oral health quality and quality of life. Therefore, it is important to reduce the number of risk factors, a requirement that includes the need to maintain good oral health [36, 71-75].

Dental Treatment Protocols in Peri-Operative Management

The integration of dental treatment protocols into Peri-Operative management for joint replacement surgery is crucial for mitigating the risk of prosthetic joint infections (PJIs) [37]. This segment provides a detailed discussion on the timing and types of dental treatments recommended before joint replacement surgery, as well as protocols for managing dental emergencies during the perioperative period.

The timing of dental interventions before joint arthroplasty is a pivotal aspect of perioperative management [59]. The primary objective is to address any active oral infections or pathologies that could contribute to postoperative complications, including PJIs [60]. Ideally, dental evaluations should occur at least three to six months before the planned orthopedic procedure [51]. This timeframe allows adequate healing post-dental treatment and minimizes the risk of bacteremia during surgery [61].

The types of dental treatments in the preoperative period generally include:

1. Treatment of Active Dental Caries and Periodontal Disease: These are the most common oral pathologies requiring attention [28]

2. Management of Endodontic Pathologies: Root canal treatments or extractions might be necessary for teeth with significant decay or infection [38]

3. Prophylactic Dental Care: In patients with a history of dental issues, prophylactic treatments such as fluoride applications or sealants may be recommended [62].

The management of dental emergencies during the Peri-Operative period poses a unique challenge [63]. Emergencies can range from acute infections to traumatic injuries of the oral cavity. The protocol for managing such emergencies includes prompt assessment and treatment, coordination with the orthopedic team, and post-treatment monitoring [64].

Antibiotic prophylaxis in the context of dental procedures for patients scheduled for joint replacement has been a subject of debate [65]. While some guidelines recommend prophylactic antibiotics to prevent hematogenous spread of oral bacteria, others argue against routine prophylaxis due to the low incidence of PJIs originating from dental procedures [66]. The decision should be individualized based on the patient's risk factors and the invasiveness of the dental procedure [67].

In conclusion, the integration of dental treatment protocols into the Peri-Operative management of joint replacement patients is a multifaceted process. It requires careful planning and coordination between dental and orthopedic teams [68]. Timely and appropriate dental interventions, combined with vigilant management of dental emergencies and judicious use of antibiotic prophylaxis, can significantly reduce the risk of PJIs and enhance overall patient outcomes [69]. As the field evolves, ongoing research and refinement of these protocols are essential to optimize Peri-Operative care for arthroplasty patients.

We conducted this study to evaluate the incidence of dental pathology and the necessity for preoperative dental clearance in patients requiring hip and knee arthroplasty. The reviewed studies showed contradictory results regarding the importance of preoperative dental evaluations. Most studies agreed on treating dental infections before arthroplasty. In the international consensus on orthopedic infections, 92% of participants agreed that patients with oral diseases should receive appropriate interventions before elective Total Joint Arthroplasty (TJA) to reduce the risk of infection despite limited evidence [70]. It has been proposed that dental screening should be necessary for high-risk patients. 76% of participants agreed that dental clearance should not be necessary for all patients undergoing TJA. In the realm of

orthopedic surgery, particularly hip and knee arthroplasty, the necessity for interdisciplinary collaboration and communication between healthcare professionals, specifically orthopedic surgeons and dentists, has emerged as a pivotal aspect of patient care. This need is underscored by the growing body of evidence indicating a significant correlation between oral health and the incidence of periprosthetic joint infections (PJIs), a major complication in joint replacement surgeries [37, 33].

The integration of comprehensive dental assessments into the preoperative evaluation for patients undergoing hip and knee arthroplasty has been recognized as a crucial step in minimizing the risk of PJIs [36]. However, this integration necessitates a seamless flow of information and a mutual understanding of the risks and protocols between the disciplines of dentistry and orthopedics. As noted by Tokarski et al. (2014), there remains a lack of standardized protocols that facilitate effective communication and shared decision-making between these specialties [52].

The purpose of this review was to develop a questionnaire for the patient requiring arthroplasty and an algorithm for its preoperative management (Fig 1). The questionnaire includes 10 items with risk factors identified in the literature regarding age, medical and dental history, ethanol and tobacco consumption, and periodic dental evaluation (Appendix 1). The primary orthopedic evaluation will have to decide based on the questionnaire if the patient requires dental clearance. Assigning a risk score to each item in the questionnaire based on literature is a subjective exercise, as the impact of each factor on the risk of postoperative infection, particularly Periprosthetic Joint Infections (PJIs), can vary. However, based on the available literature, a rough estimate of the relative importance of each item can be made. The scores are from 1 (lowest risk) to 10 (highest risk).

Based on the risk assessment scores assigned to the questionnaire items, we can determine when a patient should ideally have a dental consultation before orthopedic surgery, and when it might be safe to forego this preoperative dental check:

Indication for Preoperative Dental Consultation:

High-Risk Scores: Patients who score high (7 or above) on multiple key risk factors should have a dental consultation. This includes those with recent dental infections, extractions, or treatments, significant medical history like diabetes, rheumatoid arthritis, lupus, cancer treatments, organ transplants, or on immunosuppressants, and lifestyle factors like smoking or chronic ethanol consumption.

Recent Dental Issues: Any recent dental issues, especially within the last 3 months, such as dental infections, extractions, or severe periodontal disease, warrant a preoperative dental consultation.

Infrequent Dental Visits: Patients who have not had a dental checkup in a long time, especially if combined with other risk factors like poor oral hygiene, should see a dentist before surgery.

Potential to Forego Preoperative Dental Consultation:

Low-Risk Scores: Patients who score low (3-4) on most items, particularly in terms of dental history and medical history, might safely skip the preoperative

dental consultation. This would apply to patients with good oral hygiene practices, regular dental checkups, and no significant medical history or lifestyle risk factors.

Regular Dental Care: Patients who have regular dental checkups and no recent dental issues or ongoing treatments may not require an additional preoperative consultation, assuming they have no other high-risk medical conditions.

Good Overall Health and Hygiene: If a patient is in good overall health, without any of the high-risk medical conditions, and maintains good oral hygiene, the likelihood of dental issues contributing to postoperative complications is lower.

For an elderly patient with diabetes, a smoker who has not had a routine dental check-up for years, the recommendation of the reviewed studies is to perform dental clearance [52]. One of the most frequently mentioned items in specialized literature is the rare periodic dental evaluation [56].

For example, a patient with a history of chronic periodontal disease may require more intensive dental evaluations and interventions, as periodontal disease has been linked to an increased risk of systemic infections, including PJIs. [30, 51]

Moreover, the American Joint Replacement Registry (AJRR) and the U.S. Department of Health and Human Services have emphasized the importance of oral health as a component of overall health [27, 31]. They advocate for the inclusion of dental health evaluations in the general healthcare of patients, particularly those undergoing procedures such as joint arthroplasty.

Dental clearance will aim to discover dental infections, severe periodontal disease, the necessity of root canal treatments or dental extractions prior to any elective arthroplasty surgical intervention.

We aim to introduce this algorithm into our daily practice and to address this questionnaire to all our patients. The purpose of these efforts is to monitor and decrease the risk factors of Periprosthetic Joint Infection (PJI), especially in patients with multiple comorbidities.

Implementing such interdisciplinary protocols could also involve the use of shared electronic health records, allowing for real-time updates and access to patient information, thereby enhancing the coordination of care. Additionally, regular interdisciplinary meetings and case discussions could foster a deeper understanding of each specialty's role and contributions, leading to more comprehensive patient care.

The importance of this interdisciplinary approach is further highlighted in the context of preventive healthcare. As the aging population increases, so does the prevalence of joint arthroplasty surgeries. Therefore, ensuring optimal oral health becomes not only a matter of treating existing conditions but also a preventive measure against potential postoperative complications [57, 58, 76-78].

In conclusion, the establishment of standardized communication and collaboration protocols between orthopedic surgeons, dentists, and other healthcare professionals is imperative for the holistic management of patients undergoing hip and knee arthroplasty. Such collaboration not only enhances patient outcomes but also aligns with the evolving landscape of healthcare, which increasingly recognizes

the interconnectedness of oral and overall health.

The current research on the connection between dental health and Periprosthetic Joint Infections (PJIs) highlights significant gaps, particularly in the form of large-scale, definitive studies. Addressing these gaps necessitates future research, including randomized controlled trials and extensive cohort studies, as referenced in existing literature [37,51]. These studies could provide more robust evidence on the causal relationships between preoperative oral health and PJIs, thereby enhancing the clinical guidelines for patient management in the context of orthopedic surgery. Such research is crucial for advancing the understanding and management of PJIs in patients undergoing hip and knee arthroplasty, as emphasized in the findings of Tokarski et al. (2014) and Tai et al. (2016) [52,58].

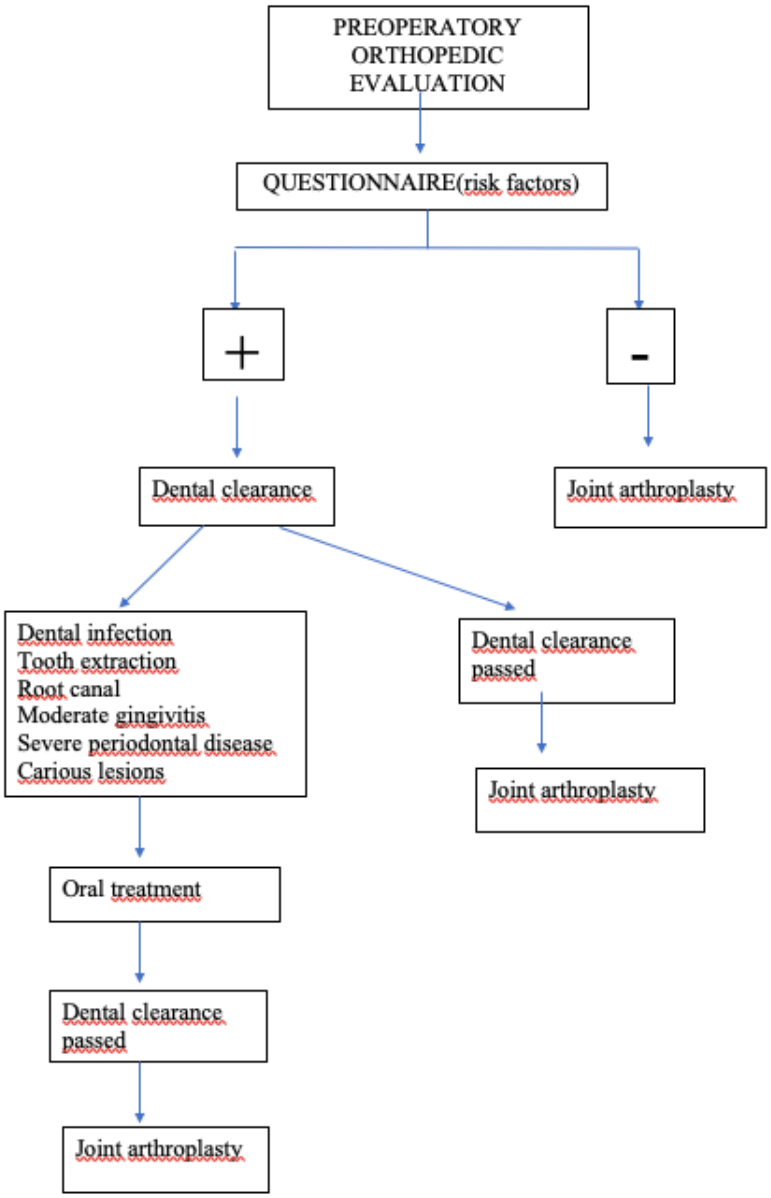

Fig 1. The Selection Algorithm for Patients for Joint Arthroplasty

CONCLUSION

Discussions about the relationship between bacteremia caused by dental procedures and subsequent Periprosthetic Joint Infections (PJI) continue, and it is deemed opportune for orthopedic physicians to request a preoperative dental evaluation. However, this practice imposes significant financial costs and other negative implications for the patient. This fact, coupled with the lack of clear evidence regarding the dental pathology that can cause periprosthetic infections, raises questions about limiting the dental evaluation to only those patients at risk of active dental infection. This necessitates a primary medical evaluation by the orthopedic physician who, upon identifying risk factors, can request a comprehensive dental evaluation.

APENDIX

	Risk Factor	**Score**
1	Age (Older patients > 65 years)	6
2	Medical History	
	Diabetes Mellitus	8
	Rheumatoid Arthritis	7
	Lupus	7
	HIV	7
	Forms of Cancer (Chemotherapy, Radiotherapy)	8
	Organ Transplant	9
	Obesity	7
3	Medical treatment	
	Use of Narcotics (Tramadol, Morphine)	5
	Immunosuppressants (Biologic Rheumatologic Medication, Oncologic Treatment, Corticosteroid Therapy, Transplant Medications)	9
4	Smoking Habits	8
5	Chronic Ethanol Consumption	7
6	Last Dental Visit	7
7	Routine Dental Checkups	
	Every 6 Months	1
	Every 12 Months	6
	Years Ago	8
8	Dental History	
	Dental Infection in the Last 3 months	9
	Dental Extraction in the Last 3 months	7
	Root Canal Treatment in the Last 3 months	7
	Dental Treatment in the Last 3 months (Gingivitis, Dental Caries, Severe Periodontal Disease)	8
9	Teeth Brushing Frequency -	
	Once a Day	4

	Risk Factor	**Score**
	Multiple Times a Day	3
	Once Every Several Days	7
	Use of Dental Floss	3
10	History of	
	Gingival Bleeding	6
	Gingival Lesions	7
	Unpleasant Oral Odor/Taste	7
	Dental Abscess	9
	Dental/Gingival Pain	8
	Dental Sensitivity	5

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