

No evidence to link prosthetic joint infections with dental procedures

In people who have hip and knee replacements, is antibiotic prophylaxis necessary for invasive dental procedures?

Uçkay I, Pittet D, Bernard L, Lew D, Perrier A, Peter R.

Antibiotic prophylaxis before invasive dental procedures in patients with arthroplasties of the hip and knee. J Bone Joint Surg Br 2008; 90:833–838

Data Sources Medline and bibliographies of relevant papers were used to source relevant studies. Case reports and references to relevant conference presentations were also included. Animal and in-vitro studies were excluded. Publications in English, French and German were included.

Study selection All relevant articles including case studies and references to abstracts of conference presentations were considered.

Data extraction and synthesis A qualitative summary was made of relevant data.

Results Of 144 articles retrieved, there were 23 prospective studies but no randomised or comparative trials. Twenty-seven reports (18.8%) favoured prophylaxis for special circumstances, 11 publications (7.6%) did not perceive any benefit and 106 (73.6%) took no clear position.

Conclusions Infections of total hip or knee replacements because of haematogenous seeding following dental intervention are very rare. The scientific rationale for systemic or local antimicrobial prophylaxis is very weak at best.

Commentary

This systematic review of the available evidence relating to antibiotic prophylaxis for patients with hip and knee replacements is timely, as it follows the recent guidance from the UK national institute for health and clinical excellence (NICE).¹ NICE recommended that antibiotic prophylaxis is not justified for patients with structural heart disease at risk of infective endocarditis. Although the NICE guidance has been widely disseminated and accepted by national bodies, this is a major change in practice and has generated some anxiety for individual cardiologists, dentists and patients, leading to NICE issuing an interim statement highlighting the importance of professionals following their guidance.

Antibiotic prophylaxis for dental patients with prosthetic joints has been a contentious issue for some time and Seymour et al. (2003)² undertook a critical review of the then-proposed British Orthopaedic Association and British Dental Association Guidance (table 1). In their article they addressed three questions: these are summarised, with their responses, in table 2.

After addressing these questions in detail, Seymour et al. (2003) then considered the proposed guidance, concluding, “the case for providing antibiotic prophylaxis prior to dental treatment in patients fitted with a joint prosthesis is weak or virtually non-existent. Furthermore, the risk from providing prophylaxis is greater than the risk of a joint infection.”

In commenting on this new, more systematic review of the area, it is worth revisiting the questions asked by Seymour and

Table 1. Proposed British Orthopaedic Association and British Dental Association guide to practice on joint replacement, dental treatment and antibiotic (2002).

1. Intuitively, good oral hygiene and regular dental advice are imperative for patients with large joint replacements or those anticipating such operations. Dental advice should be sought where there is doubt about oral sepsis.
2. Routine antibiotic prophylaxis should not be offered to all patients undergoing dental treatment.
3. Antibiotic prophylaxis is advised in patients with systemic immunosuppressive disease eg, diabetes (type I and II), rheumatoid arthritis, haemophilia or malignancy (either from the immunosuppressive effects of the malignancy or those of treatment).
4. Prophylaxis is clearly indicated where there is overt oral sepsis, eg, any kind of pre-existing oral infection which could lead to metastatic spread.
5. Prophylaxis should be considered where dental treatment is invasive, complex and of long duration.

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colleagues. In their review, Uçkay et al., highlight a computer simulation paper which indicates a low incidence of joint infections associated with dental infections (0.04%). they also point out that the reports included in the review of infections following a dental procedure often assumed of a dental cause, underlined by microbiological results compatible with oral flora, because of a lack of alternative explanation. In one human prospective study included in the review, which followed 1000 people, only three patients developed joint infections and all were associated with skin microflora.

This review agreed with Seymour et al. (2003) that, although antibiotic prophylaxis reduces bacteraemia, it does not eliminate them. What is clear from the evidence reviewed for the NICE guidance, is that that everyday activities such as chewing causes bacteraemia, and that these activities happen with much greater frequency, and for longer times, than dental procedures.

The present review did not address the cost-risk benefit directly but did come to the same conclusion as Seymour and colleagues, specifically that the scientific rationale for systemic or antibiotic prophylaxis prior to dental treatment in patients with joint prosthesis is very weak at best.

In their editorial in the same journal as this review, Oswald and Gould³ support its conclusions and recommendations, stating, "In summary there is no evidence to link prosthetic joint infections to dental procedures and none to prove that antibiotic is effective. the continued use of antibiotics would be expensive, contribute to an increase in bacterial resistance, lead to increased morbidity as a result of adverse side effects and antibiotic-associated infections and increase the risk of death."

The Working Party of the British Society for Antimicrobial Chemotherapy emphasised in 1992⁴ that there was no evidence to support the use of antibiotic prophylaxis before dental work in patients with joint replacement, and yet the debate has rumbled on. With the significant change in practice being brought about by the NICE recommendations on antibiotic prophylaxis against infective endocarditis and the increasing concerns over antibiotic

Table 2. Responses to the three questions posed

Question	Response
Do dental-induced bacteraemias cause haematogenous infections in patients with joint prostheses?	"...from an analysis of the microbiology of joint infections, it is difficult to justify antibiotic prophylaxis prior to dental treatment"
Does antibiotic prophylaxis prevent such infections?	"there is thus no evidence to support any of the usual antibiotics to be used prophylactically for total joint replacements or any indications as to the dosages to be used"
What is the cost-risk benefit of providing such prophylaxis?	"The evidence on cost-risk benefit seems to demonstrate that antibiotic prophylaxis with either amoxicillin or penicillin is not cost effective when compared with no prophylaxis"

resistance, it is time to take note of the available evidence and stop providing people who have had hip and knee replacements with antibiotic prophylaxis for dental procedures.

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1. Department of Health. NICE guidance on 'antibiotic prophylaxis against infective endocarditis'. London: Department of Health; 2008.
2. Seymour RA, Whitworth JM, Martin M. Antibiotic prophylaxis for patients with joint prostheses — still a dilemma for dental practitioners. *Br Dent J* 2003; 194:649–653.
3. Oswald TF, Gould FK. Dental treatment and prosthetic joints: antibiotics are not the answer! *J Bone Joint Surg Br* 2008; 90:825–826.
4. Simmons NA, Ball AP, Cawson RA, et al. Case against antibiotic prophylaxis for dental treatment of patients with joint prostheses. *Lancet* 1992; 339:301.

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