

# Bacteremia Following Extraction

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## 1. Bacteremia

The presence of germs in the bloodstream is referred to as bacteremia. Blood cultures are used to identify bacteria in blood. The identification of certain virulent germs in blood (*Neisseria meningitidis*, *Streptococcus pneumoniae*, *Salmonella typhi*) is of diagnostic value in application to certain diseases. The difficulty arises when the microorganism detected in blood is a usual colonizer of the skin or mucosal membranes, and moreover does not prove positive on a continuous basis in blood cultures. Thus, in a patient with clinical manifestations of disease (e.g., bacterial endocarditis (BE)), successive blood cultures must be made, with an evaluation of other signs and symptoms in order to establish a precise diagnosis[1]

## 2. Bacteria of Oral Origin

Invasion of the bloodstream by bacteria may follow a wide variety of clinical procedures and manipulations, particularly those that involve infected sites or heavily colonized mucosal surfaces [2]. After the bacteria are mechanically translocated into tissues, they are transported via the lymphatic system to the vascular system and are then, under normal conditions, rapidly eliminated by the reticuloendothelial system. As early as 1945, Beeson and co-workers pointed out the significance of the macrophages in the spleen and liver for the clearance of bacteria from blood [3]. They showed that the bacterial colony counts in hepatic venous blood were 50% to 95% lower the colony counts observed in the arterial blood of patients with bacterial endocarditis

### Bacterial Entry into the Blood Stream

Bacteria gain entry into the bloodstream from oral niches through a number of mechanisms and a variety of portals. First, and most commonly, when there is tissue trauma induced by procedures such as periodontal probing, scaling, instrumentation beyond the root apex, and tooth extractions, a breakage in capillaries and other small blood vessels that are located in the vicinity of the plaque biofilms may lead to spillage of bacteria into the systemic circulation. Obviously, a higher microbial load would facilitate such dissemination, as it is known that individuals with poor oral hygiene are at a higher risk of developing bacteremias during oral manipulative procedures (4). Second, innate microbial factors may play a role in the latter phenomenon, as only a few species are detected in experimental bacteremias despite the multitude of diverse bacteria residing within the periodontal biofilm

### Bacteremia Associated with Tooth Extraction

Tooth extraction, or exodontia, and associated tissue trauma cause bacteremia. bacteremias can follow simple dental extractions as well as extractions of impacted teeth that entail minor surgical intervention (5, 6, 7,). In such circumstances, the bacteremic incidence appears to be

influenced positively by the presence of gingivitis, periodontitis, and other odontogenic infections, such as dentoalveolar abscesses, suggesting a direct relationship between an increased bacterial biofilm burden and bacteremia (8,9). Other contributory factors for the phenomenon are the extent and duration of the surgical period and the magnitude of blood loss (10). When surgical incisions were made to facilitate the extraction of teeth, particularly impacted third molars, with subsequent insertion of sutures, nearly 10% of individuals had a bacteremia following the removal of sutures, and the incidence was not reduced by the use preoperative antiseptic rinses (11)

Despite the fact that intubation is associated with bacteremia (12), no significant change in bacteremic incidence was observed when extractions were performed under general anesthesia (13). In addition, there is no apparent change in the incidence of bacteremia with increased numbers of teeth extracted or the use of mucoperiosteal elevators (14, 15,). Similarly, pre- and perioperative administration of antimicrobial agents, such as clindamycin, erythromycin, josamycin, and cefaclor, appears to have no significant effect in reducing the incidence of bacteremia (16). Similar results have been observed with the use of perioperative topical antibiotic applications (17)

Only a few procedures related to exodontia appear to reduce surgical bacteremias, and these include preoperative administration of antimicrobial agents, such as amoxicillin, cefuroxime, and moxifloxacin, that significantly reduce the incidence of such bacteremias (18). Moreover, broad-spectrum degerming rinses, such as povidone-iodine, chloramine-T, and chlorhexidine, have been shown to reduce the incidence of bacteremia when administered as a rinse or irrigation prior to the extraction procedure or instrumentation, and povidone iodine was shown to be the most potent in reducing the incidence (19)

### Diagnosing the Source of Bacteremia

The traditional gold standard for the detection of bacteremia is the use of in vitro cultures. For this purpose, liquid, solid, or biphasic culture media have been used with various incubation periods (20). In clinical microbiology laboratories, automated blood culture systems such as the Bactec system are now routinely used for this purpose (21). These automated systems enable the rapid recognition of bacterial growth by emitting fluorescence or a color change of the sample. Once growth is detected, aliquots are sub cultured onto different agar media for further definitive identification of the offending organism(s). These automated methods are rapid, yet quantification of bacteremia is difficult, and for this purpose, the lysis filtration method is generally used. Briefly, lysis filtration involves treatment of a defined volume of blood with a medium that can digest the cellular contents and filtering through a membrane of defined pore size to capture the bacteria. The membrane is then inoculated in a growth medium to evaluate bacterial

growth The data yielded are quantitative and thus are more sensitive than those obtained with conventional and automated culture techniques (22).

### 3. Treatment

During dental procedure (such as extraction), bacteria living on the gums become dislodged and enter the bloodstream .people who are at the risk of complication due to bacteremia ( such as those who have artificial heart valve or joint or certain heart valve abnormalities) are often given antibiotics before procedure that can cause bacteremia

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