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Antibiotics Vs Mouthwash, Which is the Better Controller of Post Extraction Infections?

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ABSTRACT
The aim of this review is to determine the most effective treatment for simple extraction and to determine its role in minimizing postoperative complications, patient discomfort and provide better healing. The objective of this review is to assess the better sepsis control for post extraction treatment. The oral cavity has one of the vastest spectrums of bacterial flora in

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the body. Their increase in number can contribute to local and systemic complications. Their potential to develop infections has made antibiotics as one of the most commonly prescribed drugs in dentistry. Prescription of antibiotics are given after simple tooth extraction and this has remained as a controversial topic amongst dentists. Antibiotics are thought to increase postoperative comfort following extraction by preventing pain and wound infection. Moreover, a mouthwash is a medicated liquid which is held in the oral cavity and swished by the action of the perioral musculature to eliminate the oral pathogens, is also being increasingly prescribed by dentists. As this number increases, the question that frequently arises is which one is better. This aim of this review is asses which is the better treatment option for post extraction.

Key Words: exodontia, sepsis, control, antibiotics, mouthwash, complications

INTRODUCTION

The oral cavity consists one of the most varying spectrums of bacterial flora in the body (1,2). When this is not checked, it can cause ill effects to local and systemic health (3). The progression of devastating infections has made antibiotics one of the most commonly prescribed drugs in the Dental industry. The usage of antibiotics in certain conditions such as severe pericoronitis, cellulitis, facial space infections, and osteomyelitis has been justified (4), whereas in certain other conditions, such as periapical abscess, mild pericoronitis, dry socket, and restorative dentistry (4), the use of antibiotics is usually not justified.

Since 1980s a new class of antibiotics has not been discovered. Extensive use of the current generation of antibiotics has led to the production of various organisms that are resistant to these antibiotics (5). It is therefore necessary that antibiotics should be strictly used only where they are specifically indicated. Prescriptions prescribed by dentists may account for as much as 7–9% of total antibacterial prescriptions in primary care in some settings (6). This increases the responsibility on dental surgeons to precisely use antibiotics very selectively where indicated and not simply as a routine prophylaxis.

Tooth extraction is a surgical treatment to remove teeth that are affected by decay or gum disease (performed by general dentists). The other common reason for tooth extraction, performed by oral surgeons, is to remove wisdom teeth that are poorly aligned/developed (also known as impacted wisdom teeth) or those causing pain or inflammation.

The risk of infection after extracting wisdom teeth from healthy young people is about 10%; however, it may be up to 25% in patients who are already sick or have low immunity. Infectious complications include swelling, pain, pus drainage, fever, and also dry socket (this is where the tooth socket is not filled by a blood clot, and there is severe pain and bad odour). Treatment of these infections is generally simple and involves patients receiving antibiotics and drainage of infection from the wound.

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Prescription of antibiotics after simple tooth extraction has remained a controversial topic amongst dental academia. Antibiotics are thought to increase postoperative comfort following exodontia by preventing wound infection and therefore pain. Although bacteremia certainly occurs during simple exodontia (7), it also occurs during many other routine dental procedures in which there is no justification for antibiotic therapy. This is because the body's host response is more than sufficient to counter this level of bacteremia.
The current trend in dentistry in the developed world is shifting to the notion that antibiotics are not justified following simple exodontia (8), however surprisingly, little work has been done on this topic in the developing world where standards of oral care are far below those of the developed world. The value of antibiotic therapy in this part of the world has been questionable as the general consensus amongst dental surgeons is that antibiotics are essential to minimize postoperative complications. This trend is exacerbated by patients demand for and often self-prescription of antibiotics even in circumstances where antibiotic therapy is clearly not indicated.

For several decades, the haematogenous spread of bacteria from the oral cavity has been considered a decisive factor in the pathogenesis of 10% to 15% of episodes of infective endocarditis (IE), suggesting that certain dental procedures may represent a significant risk factor. A review of the literature revealed a prevalence of positive blood cultures after dental extractions that varied between 30% and 76% in children and between 58% and 100% in adults (9)**.** Dayer *et al*. (10) demonstrated that the incidence of IE had increased significantly in England since introduction of the 2008 NICE guidelines, which recommended that antibiotics should not be prescribed to prevent IE. Facing this dangerous situation, NICE announced it is to review immediately its guidance on the use of antibiotics to prevent IE (11)**.** In 1977, in their protocol for the prevention of IE, the American Heart Association (AHA) suggested first that disinfection of the gingival sulcus must be performed as a complement to antibiotic prophylaxis in patients considered to be at risk of IE (12).In 1992, the BSAC specified the presentation and concentration of chlorhexidine (CHX) that should be used before starting the dental procedure (13). In contrast, in 2007, the AHA did not recommend the use of any antiseptic prophylaxis protocol (14). In 2008, the National Institute for Health and Clinical Excellence (NICE) of the United Kingdom performed a systematic review of the antimicrobial prophylaxis protocols for IE and reported that: "CHX used as an oral rinse does not significantly reduce the level of bacteraemia following dental procedures" (15).

Systemic and topical antibiotics such as topical tetracycline have been proposed and used for the prevention of Alveolar Osteitis (16). Antibiotics could be expensive, may create resistance, and their efficiency in the prevention of AO has been questioned by Ritzau *et al*. (17) who did not find any preventive effect of a single dose of metronidazole in the development of AO. Delilbasi *et al*. (18) recommended using chlorhexidine solution with a lactamase inhibitor– containing antibiotic to enhance its effectiveness for the prevention of alveolar osteitis.

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Some measures were suggested in the literature for the prevention of AO including washing with saline solution, eugenol dressings to provide relief, anti-fibrinolytic agents and tranexamic acid.

Mouthwashes are often prescribed in dentistry to prevent and treat several oral conditions. In the recent times the use of naturally occurring products what is otherwise known as grandmother remedy are used on a large scale. This has now called for a newer age of mouth washes but is the new age mouth washes at par with the gold standard or even better than them this study investigates.

Chlorhexidine (CHX) is a biguanide antiseptic agent often used as an active ingredient in mouthwash designed to reduce dental plaque and oral bacteria population. It has been shown to have an immediate bactericidal action and a prolonged bacteriostatic action due to adsorption onto the pellicle-coated enamel surface (19). Since, rinsing with CHX is known to reduce oral microbe population; several studies have reported that the pre- and postoperative use of 0.12% CHX decreases the frequency of AO after mandibular third molar removal (20,21). Sridhar *et al* (22) recommended that patients could use 0.2% CHX perioperatively (twice daily, 1 day before and 7 days after the surgical extractions) for the prevention of alveolar osteitis.

Adverse reactions to CHX mouthwash have been documented in the literature and these include altered taste sensation, the bad taste of the solution and staining of dentures, tongue, gingiva, and restorations in addition to numbness and stomach upsets (23). These adverse reactions are not observed in patients who used CHX bio-adhesive gel. Bio-adhesive properties of the gel reportedly produce more direct action and prolong the time of the CHX treatment that is more efficient against AO (24,25).

Daly *et al*. in 2012 (26) concluded after a meta-analysis study of 21 trails, that perioperative rinsing with 0.12% and 0.2% chlorhexidine gluconate or applying CHX gel in the socket post-extraction are moderately evidenced to be beneficial in preventing AO. They recommended comparative studies of rinsing with CHX and application of intra-socket CHX gel to prevent dry socket. The recommended trials are in general dental practice settings with teeth other than third molars and including non-surgical extractions.

Some studies on the use of post-extraction mouthwash (warm saline, hydrogen peroxide, chlorhexidine) and antibiotics (tetracycline, amoxicillin/clavulanic acid, clindamycin, metronidazole) have reported reduction in the incidence of post-extraction alveolar osteitis (27,28,29,30,31,32)

The aim of our study is to assess the need for postoperative antibiotics following simple exodontia and determining its role in minimizing patient discomfort and postoperative complications.

DISCUSSION

This review included 18 double-blind placebo-controlled trials with total of 2456 participants undergoing extraction of third molar (wisdom) teeth. None of the included studies were of

patients undergoing tooth extraction in general dental practice, for the removal of severely decayed teeth. Thirteen of the included trials were at high risk of bias and the remaining five were at unclear risk of bias. There is evidence that antibiotics, administered to prevent infection in patients undergoing wisdom tooth extraction, reduce the risk of infection by approximately 70% (risk ratio (RR) 0.29 (95% confidence interval (CI) 0.16 to 0.50) P < 0.0001), and reduce the risk of dry socket by about one third (RR 0.62 (95% CI 0.41 to 0.95) P = 0.03). There is also evidence that patients who have antibiotics have overall less pain 7 days after the extraction compared to those receiving placebo, mean difference (MD) -8.17 (95% CI -11.90 to -4.45) which may be a direct result of the lower risk of infection (Summary of findings for the main comparison). There is no evidence of a difference between antibiotics and placebo in the outcomes of fever (RR 0.34, 95% CI 0.06 to 1.99), swelling (RR 0.92, 95% CI 0.65 to 1.30) or trismus (RR 0.84, 95% CI 0.42 to 1.71) 7 days after tooth extraction. However, antibiotics are associated with an increase in generally mild and transient adverse effects compared to placebo (RR 1.98 (95% CI 1.10 to 3.59) P = 0.02). While antibiotic prophylaxis is shown to reduce the risk of infection and dry socket, these outcomes still occur in some healthy people who take antibiotic prophylaxis associated with the extraction of impacted third molars. It is interesting to note that the rate of infection in the placebo groups in the included trials varied between (33,34) and 56% (35) with a mean of 11.8% across the placebo groups of the included studies (Additional Table 3). Based on the evidence presented in this review the use of prophylactic antibiotics will reduce infection to a mean of 3%, which means that approximately 12 (range 10 to 17) people would need to receive antibiotic prophylaxis to prevent one infection.

The incidence of dry socket in the placebo group varied between nil (36,37) and 34% (38) with a mean of 6.9%. This means that approximately 38 (range 24 to 250) healthy people would need to be treated with prophylactic antibiotics to prevent one case of dry socket (Additional Table 4). However using prophylactic antibiotics is likely to result in at least one adverse effect for every 21 people treated (range 8 to 200), though adverse effects reported in the trials were generally mild and transient.

Although the mechanism of action of the post-extraction regimen in the prevention of dry socket is not very clear, previous report by Cardoso *et al*.(39) states that irrigation of extraction socket with increasing amount of physiologic saline progressively decreases the incidence of dry socket,(40,41) while antibiotics prevent dry socket because of the antimicrobial effect against bacteria involved in pathogenesis of dry socket (42).

Implications for practice

There is moderate quality evidence that the use of prophylactic antibiotics reduces the risk of infectious complications following third molar extraction. There is no clear evidence that timing of antibiotic administration (pre-operative, post-operative or both) is important. The numbers of healthy people undergoing third molar extraction who need to be treated with antibiotics to prevent one infection range between 10 and 17, and to prevent a case of dry socket between 24 and 250 people would need to receive prophylactic antibiotics. The size of the benefit is not enough to recommend a routine use of this practice, due to the increased

risk of mild adverse effects for the patients and also the potential for contributing to the development of bacterial resistance.

Implications for research

Future trials should investigate prophylactic antibiotics effectiveness in patients at high risk of infective complications, such as immunocompromised subjects and patients who have experienced infective complications following previous extractions. Trials on patients undergoing extractions for severe caries or periodontal disease are also needed. Future studies should also measure the outcomes of symptoms and clinical assessment using standardised measures.

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