

# Correlation of antibiotic prophylaxis and difficulty of extraction with postoperative inflammatory complications in the lower third molar surgery

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## Abstract

Our aim was to investigate the correlation among antibiotic prophylaxis, difficulty of extraction, and postoperative complications in the removal of lower 3rd molars. A total of 1222 such extractions in 890 patients between January 2010 and January 2012 were analysed retrospectively. The difficulty of extraction measured by Pederson's index, antibiotic prophylaxis with cefditoren, and postoperative complications were recorded. The difficulty of extraction was significantly associated with postoperative complications ( $p=0.03$ ). There were no significant associations between antibiotic prophylaxis and postoperative complications in groups of equal difficulty ("easy" group (class I)  $p=1.00$ ; "moderate" group (class II)  $p=1.00$ ; and "difficult" group (class III)  $p=0.65$ ). There was a small but insignificant increase in the number of dry sockets and infections in class III cases. In conclusion, this study provides further evidence that antibiotic prophylaxis for the prevention of postoperative inflammatory complications is unnecessary for extraction of 3rd molars.

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**Keywords:** Mandibular third molar; Antibiotic prophylaxis; Cefditoren; Difficulty of extraction; Pederson's classification

## Introduction

The extraction of lower 3rd molars is one of the most common procedures in oral and maxillofacial units and is accompanied by many postoperative complications, including pain, trismus, and nerve damage.<sup>1–3</sup> To prevent postoperative complications, many surgeons tend to prescribe antibiotics, as reported in one study<sup>4</sup> in which about 90% of antibiotic

prescriptions were for this reason. Indiscriminate antibiotic prophylaxis could result in adverse outcomes including the development of antimicrobial resistance and a shift in the microbial population.<sup>5</sup> Some recent studies<sup>6,7</sup> have reported that routine use of antibiotic prophylaxis for extraction of 3rd molars is not necessary, but their evidence is still not sufficient and there is no universally accepted consensus.

Several authors have, however, attempted to identify risk factors to reduce postoperative complications. Among these are difficulty of extraction (usually measured by anatomical variables), which have been shown to correlate significantly with postoperative inflammatory complications in some previous studies.<sup>8–10</sup> However, few studies have considered the effect of antibiotics in their design.

The aims of our study were: to assess the correlation among the difficulty of extraction, antibiotic prophylaxis, and postoperative complications; and to provide an

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evidence-based study on antibiotic prophylaxis for the extraction of lower 3rd molars.

## Patients and methods

We made a retrospective analysis of extraction of lower 3rd molars by one surgeon in the oral and maxillofacial surgery unit at the Korea University Guro Hospital between January 2010 and January 2012. At the time of each procedure, the selection of patients into each group was not randomised in a controlled way by the surgeon, and this might have introduced some bias into the results. To reduce the bias of antibiotics, only cases in which cefditoren pivoxil (100 mg orally 3 times a day for 1 week) was prescribed were included. All the patients kept in hospital because of postoperative complications were excluded from the study. Data were collected through a survey of medical records and panoramic radiographs.

The inferior alveolar, lingual, and buccal nerves were locally anaesthetised with 2% lignocaine capsules 1.8 ml containing 1:100 000 adrenaline. If removal of the lower 3rd molar was not possible with extraction forceps, a buccal flap was raised and osteotomy created with resection of the tooth if necessary with a surgical round bur. The wound was sutured with 3/0 silk and sutures removed after a week.

The patients were divided into 2 groups: those in whom antibiotics were given orally and those who were not given antibiotics. The difficulty index described by Pederson<sup>11</sup> was measured from panoramic radiographs (Table 1). According to this index, all the cases were classified into 3 groups.

Postoperative complications including dry socket, infection, pain, and trismus (maximum mouth opening of less than 25 mm at the time of removal) were evaluated. The diagnostic criteria of dry socket were absence of blood clot in the extraction socket, bad breath, and continuously increasing postoperative pain.<sup>12</sup> The diagnosis of infection was made if there was gingival swelling, persistent pain, and discharge of pus from the extraction socket. Pain was recorded as present when patients complained of residual pain at 1 week. The surgeon who extracted the tooth did not participate in the removal of sutures or the recording of postoperative complications.

The Cochran–Armitage trend test was used to assess the association between difficulty of extraction and postoperative complications. Fisher's exact test was used to examine the significance of the association between the giving of antibiotics and postoperative complications. Statistical analysis was aided by SPSS (version 15.0, SPSS Inc., Chicago,

Table 1  
Pederson's difficulty index of extraction of 3rd molars.<sup>11</sup>

Criteria	Value
Spatial relation	
Mesioangular	1
Horizontal/transverse	2
Vertical	3
Distoangular	4
Depth of occlusal level of 3rd molar	
A (same as occlusal plane of 2nd molar)	1
B (between occlusal plane and cervical line of 2nd molar)	2
C (below cervical line of 2nd molar)	3
Space between the ramus and the distal part of the lower 2nd molar	
1 (sufficient space)	1
2 (reduced space <sup>a</sup> )	2
3 (no space)	3
Difficulty index (=A + B + C)	Total
Easy (Class I)	3-4
Moderate (Class II)	5-6
Difficult (Class III)	7-10

<sup>a</sup> The space between the ramus and the distal part of the lower 2nd molar is less than the mesiodistal diameter of the 3rd molar.

IL), and probabilities of less than 0.05 were accepted as significant.

## Results

Of the 1225 extractions of lower 3rd molars that matched the inclusion criteria, 3 patients were admitted to hospital because of postoperative complications and they were excluded (Table 2). A total of 1222 extractions in 890 patients (aged 15-69 years, mean 28) were included in the study. Pederson's index and postoperative complications are shown in Table 3.

The association between the difficulty of extraction and postoperative complications was significant in the group not given antibiotics ( $p=0.05$ ), but not among those given antibiotics ( $p=0.36$ ). Overall, the difficulty of extraction and postoperative complications were significantly associated ( $p=0.03$ ). In cases grouped by similar class of difficulty, there was no significant correlation between antibiotic prophylaxis and postoperative complications ("easy" group  $p=1.00$ ; "moderate" group  $p=1.00$ ; and "difficult" group  $p=0.65$ ). In the group given no antibiotics the incidence of infection and dry socket tended to increase as the extraction became more difficult, but not significantly so.

Table 2  
Clinical characteristics of the excluded cases. All had been given antibiotic prophylaxis.

Case no.	Sex	Age (years)	Systemic diseases	Teeth extracted	Diagnosis	Duration of hospital stay (days)
1	Female	48	None	48	Abscess of R. sublingual space	5
2	Male	36	Hepatitis B	48	Abscess of R. parapharyngeal space	6
3	Male	34	None	38	Abscess of L. buccal space	9

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