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# Treatment of mandibular third molars and pericoronitis in British military personnel: influence of guidelines from the National Institute for Health and Clinical Excellence

Thomas Pepper<sup>a,\*</sup>, Thomas Konarzewski<sup>a</sup>, Paul Grimshaw<sup>b</sup>, James Combes<sup>a</sup>

<sup>a</sup> Defence Medical Services, Whittington Barracks, Lichfield, Staffordshire, WS14 9PY, United Kingdom

<sup>b</sup> Eastman Dental Institute, 256 Gray's Inn Rd, London WC1X 8LD, United Kingdom

## Abstract

We studied the dental records of British military personnel who were less than 20 years old on enlistment, and had at least five years' service with at least five recorded dental inspections, at three military dental centres in the UK. The median (IQR) period from first to last inspection in 720 subjects was 15 (10–19) years, and the median frequency of inspection was every 14 (13–16) months. A total of 288/1250 mandibular third molars were extracted (23%). There were significant increases in the proportion of extractions stating caries in the mandibular third molar or multi-episode pericoronitis as indications ( $n = 13$ , 14%,  $p < 0.001$ ) ( $n = 15$ , 19%,  $p < 0.001$ ) post-introduction of NICE guidance. The number of extractions with no documented indication was reduced by 50 (26%,  $p < 0.001$ ) and that for a single episode of pericoronitis by 20 (9%,  $p = 0.02$ ). Extractions of mandibular third molars because of caries in the adjacent second molar increased by 4 (4%,  $p = 0.045$ ). The median age at the time of extraction before introduction of the guidelines was 23 years compared with 25 years afterwards ( $p < 0.001$ ). Twenty-five of 114 (22%) extractions of mandibular third molars were in patients over the age of 30 after the introduction of guidelines compared with 1/174 (<1%) before. The introduction of the NICE guidelines on the management of third molars has significantly changed our practice. Whether or not these changes have resulted in a net benefit to patients is still a matter for debate.

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## Introduction

The guidelines published in March 2000 by the National Institute for Health and Care Excellence (NICE)<sup>1</sup> have almost certainly altered the way in which third molars are managed, but there is little evidence of the specific changes. In this study we describe mandibular third molars that are associated with

pericoronitis, and investigate the effects of NICE guidelines on their management among British military personnel.

The guidelines recommended that the prophylactic removal of disease-free impacted third molars should be discontinued.<sup>1</sup> While guidance from other bodies has been published,<sup>2,3</sup> transformation of the management of wisdom teeth in the UK is widely attributed to NICE. Dental officers in the Royal Navy, British Army, and Royal Air Force adhere to Defence Dental Service policy when they consider the management of third molars among UK military personnel, and this policy is aligned with NICE guidelines.

Diseased mandibular third molars reduce military operational capability.<sup>4</sup> Service personnel are often deployed to hostile, remote locations where oral hygiene may be

\* Corresponding author.

E-mail addresses: [tom.pepper@outlook.com](mailto:tom.pepper@outlook.com)

(T. Pepper), [Thomas.Konarzewski808@mod.uk](mailto:Thomas.Konarzewski808@mod.uk) (T. Konarzewski), [smilewizard@mac.com](mailto:smilewizard@mac.com) (P. Grimshaw), [james.combes@nhs.net](mailto:james.combes@nhs.net) (J. Combes).

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unachievable, and from where timely evacuation to a dentist may be dangerous or impossible. A reduction in the risk of dental morbidity before deployment is therefore essential.

The commonest cause of morbidity associated with third molars during recent military operations was pericoronitis (83%), usually in association with a mandibular third molar (88%).<sup>4</sup> In most cases (54%) there had been no preceding episodes of pericoronitis.<sup>4</sup> Consequently, notwithstanding another indication, most of the military personnel deployed operationally who attended with the most common cause of morbidity associated with third molars would not have fulfilled NICE guidelines for previous removal of these teeth.

British military personnel have regular periodic, routine dental inspections that are documented in a standard manner. Radiographs are taken routinely, with frequency being risk-based.

### Patients, Material, and Methods

We collected data retrospectively from the records of military patients registered at three UK Defence Dental Service primary care centres. To be included in the study patients had to be aged less than 20 years at enlistment (as previous work suggests that most third molars have not erupted by this age<sup>5</sup>) and have a minimum of five years' service and five documented dental inspections.

The date of eruption of the mandibular third molars, and method and reason for removal, were recorded from the dental records. The main reason for extraction or referral was also recorded. Episodes of pericoronitis associated with mandibular third molars were calculated directly from entries in the clinical notes or drawn from referral letters. If the referral letter stated no reason, the notes were examined to find out if, for example, there were recorded episodes of pericoronitis or caries on radiographs or clinical charts. Angulation of third molars was categorised into horizontal, mesioangular, vertical, and distoangular using Winter's method.<sup>6</sup> In the absence of a suitable radiograph the angulation was recorded as unknown.

The tenth Newcombe method<sup>7</sup> was used to calculate 95% CI. All other statistical analyses were made with the aid of IBM SPSS Statistics for Windows (version 20.0, IBM Corp, Armonk, NY, USA). The chi square test was used to assess the significance of differences between groups, and the Mann-Whitney U test to assess the significance of differences between medians. Probabilities of <0.05 were accepted as significant. Median values are presented because the data were not normally distributed, and outliers were present.

The study was deemed "service evaluation" by the Ministry of Defence Research Ethics Committee.

### Results

Of the 720 patients included in the study, 653 (91%) were male and 67 (9%) were female. A total of 125 were Royal

Navy personnel (17%), 475 Army (66%), and 120 Royal Air Force (17%). The median (IQR) age of patients at initial dental inspection was 18 (17–19) years and the median duration from the initial inspection to the last recorded check-up was 15 (10–19) years. The median (IQR) interval between inspections was 14 (13–16) months.

A total of 190/1440 mandibular third molars (13%) were classified as congenitally absent (recorded as absent throughout the clinical record, no sign of the tooth visible on radiographs, and no evidence that it had been extracted previously). A further 224/1250 (18%) remained unerupted throughout the study. Of the mandibular third molars present 1026/1250 (82%) ultimately became (or already were) clinically visible to some extent (partially or fully erupted). The prevalence of pericoronitis in this group was 23% (235/1026). Of the 689/1026 (67%) mandibular third molars that were not clinically present initially, 333 (48%) achieved full eruption, taking a median (IQR) duration of 1 (0–3) year to do so. The remaining 356 (53%) achieved only partial eruption during the study period.

When all ipsilateral teeth in the lower buccal segment were retained (i.e. both premolars and first and second molars), mandibular third molars became clinically visible a median (IQR) of 6 (5–9) months later at the age of 21 compared with 20.6 years (Mann-Whitney U = 38557;  $p = 0.007$ ) and remained partly erupted a median of 1.4 years longer (3 years compared with one; Mann-Whitney U = 32804;  $p < 0.001$ ) than when one or more teeth in the lower buccal segment were missing before the third molar erupted. A total of 31% fewer third molars erupted fully when all the teeth in the lower buccal segment were retained compared with when one or more of the teeth were missing (213/522 compared with 120/167, 95% CI 23% to 39%, chi square 48.852,  $df = 1$ ,  $p < 0.001$ ). This difference was more pronounced when a lower molar tooth was missing (Table 1).

The incidence of pericoronitis was 13% greater in the group in which all the teeth in the lower buccal segment had been retained (167/522 compared with 31/167, 95% CI 6.0% to 21.0%, chi square 11.142,  $df = 1$ ,  $p = 0.001$ ). The median number of episodes experienced/patient for both groups was one. If the ipsilateral lower first molar was missing, the incidence of pericoronitis was 26% less than if there were no missing teeth in the lower buccal segment (167/522 compared with 4/68, 95% CI 17 to 32%, chi square 19.927,  $df = 1$ ,  $p < 0.001$ ).

Having one or more teeth missing from the lower buccal segment before the third molar erupted reduced the relative risk of pericoronitis by 42% (95% CI 18% to 59%), whereas a missing lower first molar resulted in reduction in relative risk of 82% (95% CI 52% to 93%).

When we considered mandibular third molars that partially erupted but did not fully erupt during the study period, the prevalence of pericoronitis was 44% (183/415). The incidence of impaction by angulation is shown in Table 2. While vertical impaction was the most common (146/415, 35%),

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