ORIGINAL PAPERS

ARE SOLDIERS AT INCREASED RISK OF THIRD MOLAR SYMPTOMS WHEN ON OPERATIONAL TOUR IN IRAQ? A PROSPECTIVE COHORT STUDY

J Breeze[1], AJ Gibbons[2]

[1]Trainee in Oral and Maxillofacial Surgery, King's College Hospital, London SE1 9RT, [2]Consultant in Oral & Maxillofacial Surgery, Peterborough District Hospital, Thorpe Road, Peterborough, Cambridgeshire PE3 6DA

Abstract

Objective **Pain associated with third molar (wisdom) teeth is a common cause of morbidity for soldiers in the United Kingdom and on operational deployments. This study compared the incidence of third molar symptoms between soldiers serving in Iraq and soldiers stationed in barracks in Northern Ireland and assessed if pre-deployment screening could be improved.**

Method **Data was collected in a prospective cohort study over five consecutive months. Dental officers recorded each time an Army soldier presented with third molar related symptoms.**

Results **1% of soldiers in Iraq had third molar related symptoms in this time compared to 1.4% of those stationed in Northern Ireland. The range of pathologies and teeth affected were similar between locations. In both locations approximately 40% of teeth that caused problems had been symptomatic before and 13 -16% had untreated decay.**

Conclusions **This study suggests that soldiers experience a lower incidence of symptoms related to third molars when in Iraq compared to Northern Ireland (P<0.033) possibly due to pre-deployment treatment. If ideal pre-deployment screening of third molars was carried out and National Institute of Clinical Excellence guidelines applied 38% of the Operation Telic group of patient's problems could have been prevented.**

Keywords **Third molars; Wisdom teeth, cohort Study**

Introduction

Acute pericoronitis is a painful, debilitating infection that is most commonly found among young adults with erupting mandibular third molars. Pathology related to third molar teeth represents a significant cause of morbidity for soldiers deploying on operations. Amongst British and American troops in the first Gulf War and on deployments to Bosnia and Kosovo, symptoms from third molars were the second most common cause of emergency dental attendances (1). Upper respiratory tract infections and stress are the important predisposing factors for pericoronitis (2, 3). The potential of dental emergencies to reduce combat effectiveness is a major concern to the U.S. Army; dental emergencies have been shown to loose duty time, decrease unit effectiveness, disrupt routine care and cause hindrance to the military mission (4).

In the 1960s a policy of prophylactic removal of third molars in all military personnel was advocated (5). However, the benefits of preventing third molar pathology by prophylactic removal must be weighed against the risks of complications. These include pain, infection, bleeding, swelling, and permanent lingual nerve and inferior alvelolar nerve paraesthesia (6).

Over the past decade, National Institute of Clinical Excellence (NICE) (7) and Royal Colleges have published a number of guidelines on indications for the extraction of third molar teeth. (7, 8, 9). They advise not to remove asymptomatic teeth and to avoid prophylactic removal of lower third molars. These guidelines have led to a significant reduction in the number of referrals and the numbers of third molar teeth extracted in civilian practice (10). In general, these guidelines have been adopted by the Armed Forces. However, each case is assessed individually and the serviceman's accessibility to dental care and the effects of the potential third molar pathology on their military duties are taking into consideration.

To compare the incidence of third molar symptoms and assess if pre-deployment screening could be improved, we undertook a prospective cohort study between soldiers on operations in Iraq on Operation Telic (OP TELIC) with those stationed in the United Kingdom (UK). Northern Ireland (N. Ireland) was chosen to represent the UK as although it is still a theatre of operations, in the current political environment, a posting there gives a period of relative stability. No other units currently serving in the United Kingdom or Germany are likely to experience a similar period of uninterrupted time without being deployed elsewhere either on operations or on exercise.

Correspondence to: Major J Breeze
Trainee in Oral and Maxillofacial Surgery, King's College Hospital, London SE1 9RT
Email johno_breeze@hotmail.co.uk

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Method

The data was collected over five consecutive months in both locations. This ranged from 01 October 2004 to 28 February 2005 in Iraq and from 01 December 2004 to 30 April 2005 in N. Ireland. Eight different Army dental officers in four locations in Iraq and seven Army dental officers in six locations in N. Ireland collected data. Only Army units were included in both locations. Dental officers were unaware of the results from other officers. All soldiers and officers who deployed to Iraq and presented with symptoms related to their third molars were included. Any civilians or members of foreign Armed forces (whether allied or not) were not included. Any soldier attending more than once would have each presentation recorded as a separate episode. If present, multiple presenting pathologies were recorded but were counted as only one separate attendance.

A list of presenting pathologies associated with third molars (Table 2) and the study's inclusion criteria were given to every Dental Officer in Iraq and N. Ireland. The precise tooth causing symptoms was recorded using FDI notation. Each patient was asked had they had symptoms from the tooth before and if so, how many times. The data was analysed by a Chi- squared test using the Stata© statistical package.

1. Caries in the third molar tooth
2. Pericoronitis affecting the third molar tooth
3. Facial swelling and/or cellulitis
4. Untreatable pulpal or periapical disease of the third molar
5. Caries in the second molar due to the third molar
6. Periodontal disease between the second and third molars
7. Disease of the third molar follicle (cyst or tumour)
8. External resorption of second or third molar
9. Third molar in the line of a bony fracture
10. Fracture of the third molar
11. Other: diagnosis not recorded by Dental Officer

Box 1 – Potential diagnoses for 3rd Molar pathology

Results

The population sizes were 9500 British Army soldiers in Iraq and 7450 in N. Ireland. Populations were calculated by adding up data provided by headquarters G1 sources at intervals over the five months. We were advised that there was approximately a +/- 1% margin of error in calculating these population sizes in both locations, resulting from regular movement of soldiers in and out of the operational environment. There was one Dental Officer who did not respond in N. Ireland, representing 1100 soldiers. Therefore, the population size studied in N Ireland as 6350.

Over the five month period, 99 soldiers in Iraq presented with symptoms from one or more third molar tooth. No soldier presented twice. In 12 of these 99 episodes, the Dental Officer diagnosed two separate simultaneous pathologies associated with one or more third molar. Ninety soldiers in N. Ireland presented with symptoms associated with one or more third molar. Again no soldier presented twice. In 5 of these 90 episodes, the Dental Officer diagnosed two separate simultaneous pathologies associated with one or more third molar. 1.0% of soldiers in Iraq had third molar symptoms in this time period compared to 1.4% of those stationed in N. Ireland.

Annual morbidity rates for third molar associated symptoms are given in Table 1.

Location	Population size	Total number of soldiers presenting with third molar related symptoms	Annual morbidity rate per 1000 soldiers
Iraq	9500 +/- 1%	99	25
N. Ireland	6350 +/- 1%	90	34

Table 1- Annual morbidity rate for third molar associated symptoms

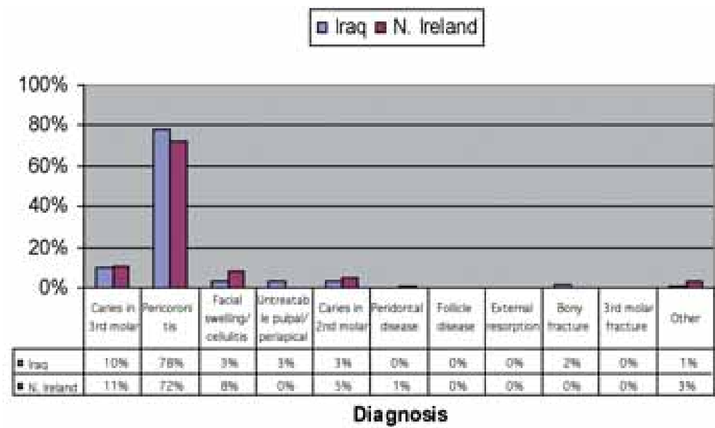

Figure 1 – The distribution of presenting pathologies

Overall 61.9 % of patients (117 of 189) were aged 18-23 and the percentage was similar in both locations.

The range of presenting pathologies was similar between locations (Figure 1). Pericoronitis was the commonest pathology (88 of 111 in Iraq and 68 of 95 in N. Ireland). The next most common pathology was the presence of dental caries in the third molar tooth (11 of 111 in Iraq and 10 of 95 in N. Ireland).

There was a lower incidence in symptoms associated with third molar teeth in Iraq than in N. Ireland (P= 0.033).

In Iraq 60 of the 99 teeth (61%) had never previously been symptomatic compared to 55 of 90 (62%) in N. Ireland (Figure 2). The causative teeth were similar in both locations with lower third molars causing 87 of 99 (86%) presentations in Iraq and 76 of 90 (78%) in N. Ireland (Figure 3). Upper third molars were responsible for symptoms in 14 of 99 (14%) presentations in Iraq and 20 of 90 (22%) presentations in N. Ireland.

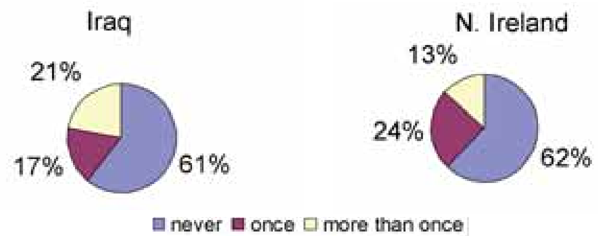

Figure 2 - Had the teeth been previously symptomatic?

Discussion

A review by Richardson (11) of the dental morbidity experienced by U.K. armed forces serving in Iraq on OP TELIC I from January to May 2003 gave total dental annualized morbidity rates of 160 cases per 1,000 per year for the Army. Lost restorations and fractured teeth were by far the most common problems experienced (32.5%), followed by pericoronitis (13.4%), pulpitis, and periapical pathology. Both the rates of morbidity and the types of problems experienced were very similar to those reported by other nations in previous conflicts. Richardson's

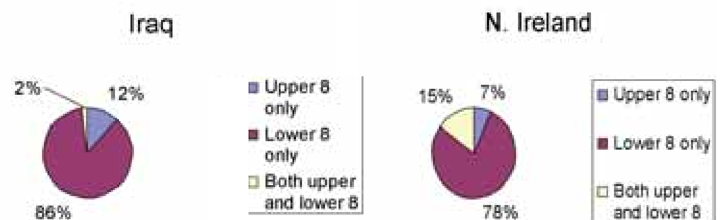

Figure 3 – Teeth causing symptoms

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review produced an annualized morbidity rate of 21 cases of pericoronitis per 1000 soldiers per year for the Army. Our study showed that at least 20% of third molar symptoms are due to causes other than pericorinitis. The annualized morbidity rate of 25 cases of pericoronitis per 1000 Army soldiers in Iraq per year was very similar to Richardson's. The annualized rate of pericorinitis in N. Ireland was higher at 34 cases per 1000 per year.

In both locations the majority of soldiers presenting with symptoms were in the 18-23 year old age bracket, serving in infantry roles. Those in N. Ireland were often newly posted from basic training, and in the majority of cases they had received little or no dental treatment between joining the Army and being posted to N. Ireland. They were highly unlikely to have had any of their third molars removed in this time as the intensity of basic training does not usually allow for this. Infections associated with third molars are likely to have been managed by conservative measures including antibiotics. On the other hand, the Defence Dental Services strives to complete all outstanding dental treatment for soldiers deploying on tour to Iraq, including extraction of any symptomatic third molars. Our results indicate that pre-deployment treatment has reduced the incidence of third molar associated symptoms when on operational tour in Iraq in comparison with N. Ireland. However, caries was not detected by the dental officer prior to deployment to Iraq in 13% of symptomatic patients (10% caries in third molars and 3% in second molars). Moreover, 38 % of symptomatic patients in Iraq had previous episodes of symptoms. Therefore, improved pre-deployment screening and treatment for caries and symptoms associated with third molars could further reduce the incidence of symptoms for soldiers serving in Iraq.

Approximately 60% of soldiers in N. Ireland and Iraq had no previous symptoms form their third molars. Surprisingly, factors such as poor oral hygiene, increased smoking and dehydration, that are commonly assumed to be problems for soldiers on duty in Iraq, did not cause a greater incidence of third molar symptoms.

Our study showed that in soldiers in Iraq, upper third molars caused little morbidity. Hence in military personnel an expectant policy towards the treatment of upper third molars appears reasonable. The most common cause of extraction of the lower third molars was pericoronitis followed by caries, in keeping with the results of previous studies (12, 13).

A retrospective cohort analysis of dental emergencies experienced by American soldiers in Bosnia from September 2000 to March 2001 (14) showed that defective restorations or caries accounted for 25% of the diagnoses prompting soldiers to report for dental sick call. Third molar-related symptoms (pain or pericoronitis) accounted for 19%, and periodontal conditions accounted for less than 5%. The author advocated that more frequent removal of unerupted or partially erupted third molars could have the greatest potential for reducing the rate of emergencies. Nevertheless, these benefits must be weighed against the potential risks of third molar removal.

In military patients deployed overseas, access to dental care may be limited. Clear indications regarding the removal of third molars for these patients remains to be established. NICE guidelines do mention a lower threshold for third molar removal in submariners but not in other military personnel. There is general agreement that prophylactic removal of disease free wisdom teeth is not justified (15). However, more evidence is required to quantify the risks to patients with infrequent access to dental care, of leaving partially erupted third molars in situ (16). Leaving third molars *in situ* when they are mesioangularly impacted can lead to a high incidence of decay in the distal aspect of the second molars (17).

In military patients asked hypothetical questions concerning the extraction of asymptomatic third molars, 87% preferred extractions prior to a deployment where treatment in that operational environment would be difficult (18). A further 89% would have preferred to have had their third molars removed prior to leaving the military as treatment as civilians may no longer be free. Therefore, there appears to be a general acceptance of third molar removal amongst military patients.

Conclusion

This study suggests that soldiers experience a lower incidence of symptoms related to third molars when on operational tour in Iraq compared to those in barracks in N. Ireland (P<0.033). Pre-deployment treatment may account for this. However, 38% of third molar symptoms experienced in Iraq could have been prevented by correct assessment and treatment prior to deployment.

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