

# Influence of Surgicel gauze on the incidence of dry socket after wisdom tooth extraction

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## تأثير شاش السيرجيسيل على حدوث السنخ الجاف بعد قلع ضرس العقل

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**الخلاصة:** لوحظ في مستشفى بالدمام، في المملكة العربية السعودية، حدوث العلة المعروفة بالسنخ الجاف لدى العديد من المرضى بعد قلع ضرس العقل. ولما كان السيرجيسيل (السلولوز المؤكسد) يُستخدم أحياناً لوقف نزف الدم في أسنخ المرضى الذين تم قلع أسنانهم تحت تأثير التخدير العام، فقد تم تحليل سجلات 104 من أضرار العقل السفلية التي تمت إزالتها جراحياً من 86 مريضاً، فوجد أن النسبة المئوية لحدوث السنخ الجاف بلغت 25% في 20 ضرساً تمت معالجتها باستخدام السيرجيسيل، بالمقارنة مع نحو 6.0% في 84 ضرساً لم تعالج بالسيرجيسيل، مما يدل على أن استخدام السيرجيسيل في قلع ضرس العقل يترافق بزيادة حدوث السنخ الجاف.

**ABSTRACT** At a hospital in Damman, Saudi Arabia, it was noticed that many patients had developed dry socket after surgical removal of wisdom teeth. To enhance haemostasis, Surgicel™ (oxidized cellulose) gauze was sometimes used in the tooth socket in patients who were operated under general anaesthesia. An analysis was made of the records of 104 lower wisdom teeth removed surgically from 86 patients. The incidence of dry socket in the 20 Surgicel-treated teeth was 25.0%, compared with 6.0% among the 84 non-Surgicel-treated teeth. The use of Surgicel in wisdom tooth extraction seems to be associated with an increased incidence of dry socket.

## Influence du pansement Surgicel® sur l'incidence de l'alvéolite après extraction d'une dent de sagesse

**RÉSUMÉ** On a constaté dans un hôpital de Damman (Arabie saoudite) que de nombreux patients avaient développé une alvéolite après extraction chirurgicale d'une dent de sagesse. Pour améliorer l'hémostase, le pansement Surgicel® (cellulose oxydée) a parfois été utilisé dans l'alvéole dentaire chez des patients opérés sous anesthésie générale. Une analyse des dossiers de 104 extractions chirurgicales de dents de sagesse inférieures réalisées chez 86 patients a été effectuée. L'incidence de l'alvéolite pour les 20 dents traitées avec des compresses Surgicel® s'élevait à 25,0 % contre 6,0 % pour les 84 dents n'ayant pas été traitées avec ces compresses. L'utilisation de Surgicel® dans l'extraction de dents de sagesse est associée à une augmentation de l'incidence de l'alvéolite.

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Received: 28/09/03; accepted: 11/11/04

## Introduction

Dry socket or post-extraction alveolitis is a poorly understood form of inflammation occurring in a socket following removal of a tooth. The condition is more common in the mandible than in the maxilla and in the posterior teeth compared to the anterior [1-4]. There is no definitive cause for this condition but many precipitating factors have been implicated [5-8], including frequent changing of pressure-dressing gauze, frequent mouth rinsing [8], underlying infection [9-11], smoking [12], oral contraceptive use [13], undue surgical trauma, [1-4,14] and excessive amounts of local anaesthesia [17]. In addition, the condition has been reported to occur more frequently in patients aged over 40 years [2,9].

Clinically the patient presents with pain often radiating to the ear on the same side as tooth extraction. Examination reveals an acutely painful tooth socket containing bare bone and some broken-down blood clots. Upon removal of the latter, the socket walls look white and clear of granulation tissue [3,4].

Several methods are reported to reduce the incidence of dry socket [16,19-22]. These include the use of chlorohexidine mouthwashes [20,22], the placement of medicated packing into the extraction sockets [22,23] and the prophylactic use of metronidazole and lenampicillin [24,25].

Oxidized regenerated cellulose gauze (Surgicel™, Johnson & Johnson, Piscataway, New Jersey, USA) is a haemostatic packing agent that accelerates the clotting mechanism [25]. The material, when soaked with blood, swells to form a gelatinous mass that plugs the bleeding site and hence stops bleeding. Surgicel is one of the most commonly used bioabsorbable topical haemostatic agents used in general surgery. In periodontal surgery it was found to enhance

healing [26], while in bone surgery it was reported to slightly retard healing [27,28].

Surgicel is not frequently used in oral surgery practice and the only indication of use is when there is bleeding that cannot be controlled by simple packing measures and suturing.

In the Department of Oral and Maxillofacial Surgery of Al-Mouwasat Hospital, Dammam, Saudi Arabia, it was noticed that a number of patients developed dry socket after wisdom tooth removal under general anaesthesia. The records of these patients showed that in many cases Surgicel was placed in the tooth socket following tooth removal to enhance haemostasis. It was therefore decided to investigate the relationship between the occurrence of dry socket among these patients who had their wisdom teeth removed surgically and the use of the product Surgicel.

## Methods

The records were studied for all patients who had their wisdom teeth removed surgically during the period November 1996 to June 1998 at the Department of Oral and Maxillofacial Surgery, Al-Mouwasat Hospital. Patients operated outside this period as well as patients treated by general dentists in the department were not included. Wisdom teeth with periapical pathosis or existing pericoronitis were excluded from this study. Carious wisdom teeth with no periapical pathology as well as wisdom teeth with treated pericoronitis were included in the study.

One person (an oral and maxillofacial surgeon) performed all the surgical procedures. A class 1 envelope flap with a distal relieving incision was raised. The bone around the tooth was removed using an electrical drill. Of the lower wisdom

teeth removed under general anaesthesia, some sockets had Surgicel placed into them to achieve haemostasis. Black silk (3/0) suture was used to close the wound edges. All patients had an antibiotic cover of clindamycin 150 mg every 8 hours, for 6–7 days post-operatively, together with chlorhexidine mouth rinse to be used every 8 hours, beginning the next day following the operation. Sutures were removed after 6 days.

The results were analysed using the chi-squared test.

## Results

The study included 86 patients (48 males, 38 females); 42 of these patients had their wisdom teeth (60 teeth) removed under general anaesthesia, while the remaining 44 patients had their wisdom teeth (44 teeth) removed under local anaesthesia. Mesio-angular impaction was the commonest type of impaction removed, followed by dis-toangular and horizontal impaction (56%, 37% and 8% of the patients respectively). The age of the patients ranged from 20 to 50 years.

Of the 60 lower wisdom teeth removed under general anaesthesia, 20 sockets had Surgicel placed into them to achieve haemostasis.

Overall 10 patients reported to the oral surgery clinic after 2–3 days complaining of severe pain at the site of surgery. Clinical examination revealed that all these patients had developed dry socket. Of the 10 patients, 7 were males and the remaining 3 were females. None of the females who developed this complication were taking oral contraceptives. The rest of the patients had an uneventful recovery.

The overall incidence of dry socket was 9.6% (10/104 teeth removed) (Table 1). Of the teeth removed and treated with Surgicel, 25.0% (5/20 teeth) showed dry socket (Table 1). Two patients developed a short-lived numbness of the lower lip, probably due to surgical trauma. In patients who had both lower wisdom teeth removed, bilateral dry socket was not seen. In the teeth removed and treated without Surgicel, only 6.0% (5/84 teeth) developed dry socket, an incidence which is significantly lower than the Surgicel-treated group (chi-squared test,  $P < 0.02$ ). In the non-Surgicel group, 3/40 (7.5%) teeth were removed under general anaesthesia and 2/44 (4.5%) under local anaesthesia ( $P > 0.05$ , not significant).

## Discussion

Dry socket results from a disruption of the normal healing mechanism. The incidence

**Table 1 Influence of Surgicel on the incidence of dry socket after wisdom tooth extraction**

| Operation               | No. of teeth extracted | No. of dry sockets | Incidence % |
|-------------------------|------------------------|--------------------|-------------|
| <i>Without Surgicel</i> | 84                     | 5                  | 6.0         |
| General anaesthesia     | 40                     | 3                  |             |
| Local anaesthesia       | 44                     | 2                  |             |
| <i>With Surgicel</i>    | 20                     | 5                  | 25.0        |
| <i>Total</i>            | 104                    | 10                 | 9.6         |

$P < 0.02$ , comparing groups treated with and without Surgicel.

rate of this event is variable, ranging from 4.1% to 30%, and associated with a number of predisposing factors as well as the type of prophylaxis used [1,5,8].

In this study the overall incidence of dry socket after wisdom tooth removal was 9.6%, which is similar to other findings previously reported [1–4,7]. A higher rate of dry socket was found among patients having their wisdom teeth removed under general anaesthesia (7.5%) than under local anaesthesia (4.5%). This finding, although not significant, may be due to the severity of surgical trauma rendered, as many of these wisdom teeth were buried deep in the mandible. The incidence of dry socket among the Surgicel-treated teeth was significantly higher (25.0%) than in the non-Surgicel-treated teeth (6.0%), under local and general anaesthesia.

Surgicel is one of the most common biodegradable materials used to facilitate haemostasis and control bleeding. The material causes haemostasis by a physical mechanism rather than a chemical reaction, i.e. by compressing the bleeding vessels

rather than influencing the clotting factors *per se* [25]. The phenomenon of dry sockets in patients in whom Surgicel was used is probably precipitated by the continued chemical effect of the material, which has been found to degrade and to resorb slowly at surgery sites [29,30]. According to the manufacturer's instructions, users should be cautious when using Surgicel in solid bony cavities [25]. This may be the reason for our findings. However, this was a simple observational study and a properly designed experimental study is needed to take account of the many confounding factors, such as the type of impaction of the tooth, the degree of impaction of the tooth, the amount of surgical trauma rendered, and the amount of debridement and socket washing performed.

In summary, Surgicel is a potent haemostatic agent, the application of which in extraction sockets was associated with an increase in the incidence of dry socket after wisdom tooth extraction. If it is to be applied it should be removed once haemostasis is achieved.

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#### **Communicable disease profile for Iraq**

The *Communicable disease profile for Iraq* aims to provide up-to-date information on the major communicable disease threats faced by the emergency-affected population. The list of endemic and epidemic diseases has been selected on the basis of the burden of morbidity and mortality and includes acute lower respiratory tract infections (ALRI), cholera, bacillary dysentery, measles, leishmaniasis, malaria, meningitis and tuberculosis. Diseases that have global eradication or elimination goals are also included. The document outlines the burden of communicable diseases in Iraq for which data are available, provides data on recent outbreaks in the country, and presents disease-specific guidelines on the prevention and control of these diseases. The Profile also includes an annex on the incidence of major communicable diseases and vaccination coverage rates in the 6 countries neighbouring Iraq.

For more information contact the Communicable Diseases in Complex Emergencies Programme, Communicable Disease Cluster, HQ/Geneva <http://www.who.int/infectious-disease-news/IDdocs/whocds200317/index.htm>