

New Flap Retractor for Oral Surgery (HK Retractor)

الخلاصة

مقدمة: ترتبط في بعض الأحيان العمليات الجراحية الفموية بمضاعفات ناتجة عن عدة أمور منها نوعية الأدوات المستخدمة في مثل هذه العمليات. ونحن في قسم جراحة الفم والوجه والفكين، كلية طب الأسنان، جامعة الملك سعود واجهنا بعض المضاعفات المرتبطة باستخدام بعض الأدوات المتوفرة وذلك مثل إصابات الأنسجة الرخوة أو حرق الشفة خلال بعض العمليات. وتستخدم المبعادات الحالية لإبعاد الأنسجة الرخوة ولكنها لا توفر حماية جيدة لهذه الأنسجة خلال إجراء العمليات الجراحية. الهدف من هذه الدراسة هو تصميم لمبعاد جراحي جديد والذي يمكن استخدامه في العمليات الجراحية خاصة في عمليات الفك السفلي. **طرق البحث:** استندت أبعاد المبعاد على حجم الفم للمريض البالغ وتم تصميم ثلاثة أحجام مختلفة باستخدام برنامج أوتوكاد للرسومات الهندسية. **النتائج:** بعد تصنيع المبعاد بأحجامه المختلفة تم توزيعها ليتم استخدامها بواسطة جراحي الوجه والفكين في قسم جراحة الوجه والفكين وتم إرفاق استبانة عن مدى ارتياحهم وتوصياتهم حول المبعاد الجديد. كان هناك اتفاق على خصائص حماية الأنسجة الرخوة للمبعاد الجديد مع توصية واحدة لرفع حواف المبعاد الجانبية لتوفير راحة أكثر المريض أثناء استخدام المبعاد. **الاستنتاج:** يوفر المبعاد الجديد حماية أفضل للأنسجة الرخوة مع تغطية نطاق واسع من هذه الأنسجة أثناء العملية الجراحية. إن ابتكار مثل هذه الأدوات هو مسألة مهمة لإجراء عمليات جراحية بأقل المضاعفات الناتجة عن استخدام الأدوات الجراحية المختلفة.

ABSTRACT

Introduction: Oral surgical procedures sometimes are associated with local complications related to the instruments used in such procedures. We at the Department of Oral and Maxillofacial Surgery, College of Dentistry, King Saud University encountered many local complications such as soft tissue injuries or lip burning during some of the performed procedures. The retractors we use provide good soft tissue retraction but do not provide good soft tissue protection during the surgical procedure. The aim of this study was to design a new surgical retractor which can be used for different oral surgical procedures such as the lower third molar oral surgery. **Materials & Methods:** Dimensions of the retractors were based on the average adult patient and made available by three different sizes using the AutoCAD Software. After manufacturing the reactors it was distributed to be tested by our experienced surgeons and an evaluation form was used to explore their satisfaction with the new retractor. **Results:** The new retractor was designed and manufactured in three different sizes, small, medium and large. The retractor was tested by experienced surgeons at the department of Oral and Maxillofacial Surgery, College of Dentistry, King Saud University. There was an agreement on the soft tissue protection properties of the new retractor with one recommendation for everting the edges for better comfort. **Conclusion:** The new retractor provided better soft tissue protection by its wider coverage. Innovation is an important issue for better surgical procedures with minimal complications.

INTRODUCTION

Exodontia is the most common procedure done by the oral and maxillofacial surgeons specially the surgical removal of third molar. The incidence of perioperative and postoperative complications in these surgeries is unacceptable but unfortunately always present (de Boer et al., 1995). Perioperative complications include: soft tissue injuries, Problems with a tooth being extracted like root fracture or displacement, injuries to adjacent teeth like crown fracture or luxation, injuries to bone, injuries to adjacent vital structures such as nerves or temporomandibular joint and oroantral communications (Contar et al., 2010). Furthermore, soft tissue injuries include tear of a mucosal flap, a puncture wound, a stretch or an abrasion. Puncture wounds may result from using an uncontrolled force which may lead to slippage of an instrument puncturing or tearing adjacent soft tissue. Abrasions or burns may occur on the lips, corners of the mouth or flaps. It is usually a result of the rotating shank of the bur rubbing on the soft tissue or on the metal retractor which is in contact with the soft tissue.

Abrasions represent a combination of friction and heat damage. Such injuries happen if the surgeon was only focusing on the cutting end of the bur and not aware

of the location of the shank in relation to the cheeks and lips. Most of the time, soft tissue injuries occurred due to the improper manipulation of instruments during the surgery. Surgical retractors are essential implements for many oral surgical procedures. During the surgery it is required to expose and reflect the underlying tissue. The covering tissue must be held away and protected at the same time from any injury. Over the past years we have encountered many injuries to the buccal mucosa and the lips during surgical removal of lower third molars. These injuries were mainly due to poor soft tissue protection by the available retractors. Overheating of the surgical handpiece used to cause lip injury while the surgeon is concentrating on the surgical procedure. The lingual nerve damage sometimes occurs after the removal of mandibular third molar producing impaired sensation or permanent sensory loss. The exact mechanism of lingual nerve damage during third molar surgery is controversial and it is mainly due to lingual plate perforation and lingual flap trauma during ostectomy or tooth sectioning, usage of lingual flap retractor and supra-crestal incision because the nerve can be located in this region in some cases and may be sectioned (Meyer and Bagheri, 2011). In some studies the rate of lingual nerve

damage during surgical removal of impacted third molar was 6.6% and the damage occurred even without reflection of the lingual soft tissue (Lata and Tiwari, 2011). Lingual soft tissue retraction is done mainly by periosteal elevator which is narrow to provide complete protection for the lingual soft tissue including the lingual nerve. Many factors can contribute to the incidence of soft or hard tissue injuries during surgery including the operator experience and the instruments used in the surgery (Jerjes et al., 2006). So there is always a clinical need for improved maxillofacial devices such as surgical instruments and retractors, which are used in the third molar surgery in order to make such procedure safer for the area of the surgery as well as for the surrounding tissues.

The aim of this project was to design a new retractor for better soft issue protection during oral surgical procedures such as the surgical removal of lower third molars.

MATERIALS AND METHODS

Designing of new retractors was done using the modeling and engineering software *AutoCAD*. All dimensions were based on the average adult patients but three different sizes were made available.

The new deigned retractor aimed to provide better buccal soft tissue and lips protection during oral surgical procedures such as the removal of impacted third molar. The retractors were manufactured and tested by experienced surgeon in the routine third molar surgical removal procedures for patients attending the Oral and Maxillofacial Surgery clinics, College of Dentistry, King Saud University, Riyadh to explore their satisfaction and recommendation for the newly designed retractor.

RESULTS

The invention which is shown in figures 1-4 below is related generally to the field of oral and maxillofacial surgery and more specifically to the surgery in the mandible. The Primary objective of this invention was to provide better protection for soft tissue specially the inner surface of the cheek during the surgery and indirectly retract the lower lip avoiding its abrasion by the surgical handpiece. The Secondary Objective is to have surgeons' satisfaction with such new retractor by providing more reliable instrument assuring that the soft tissue is protected and less soft tissue damage will occur during oral surgical procedure.

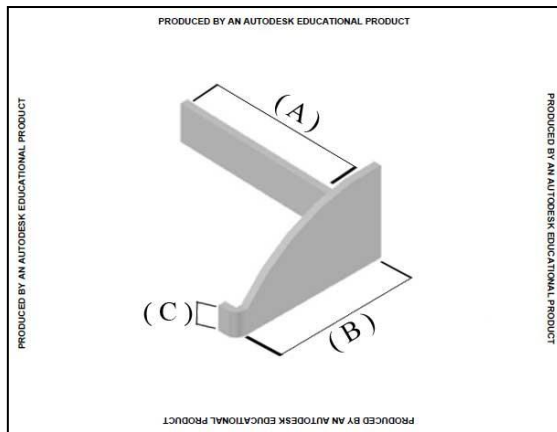


Figure 1: HK Retractor consist of three parts; (A) the handle, (B) working part and (C) flap reflecting end.

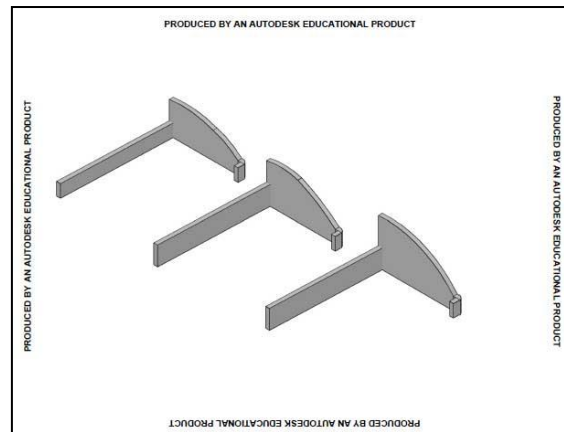


Figure 3: Other side view of HK Retractors.

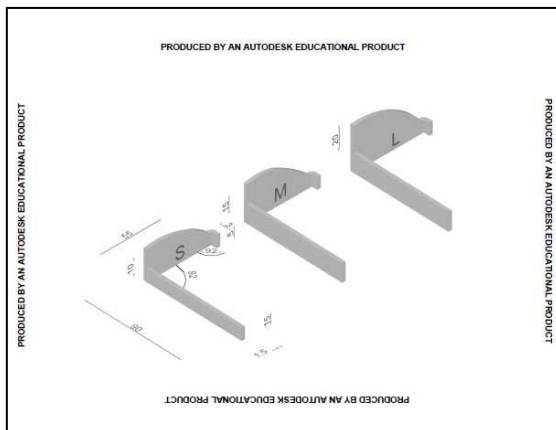


Figure 2: The Measurements of the three different sizes of the HK retractor; (S) small, (M) medium and (L) large.

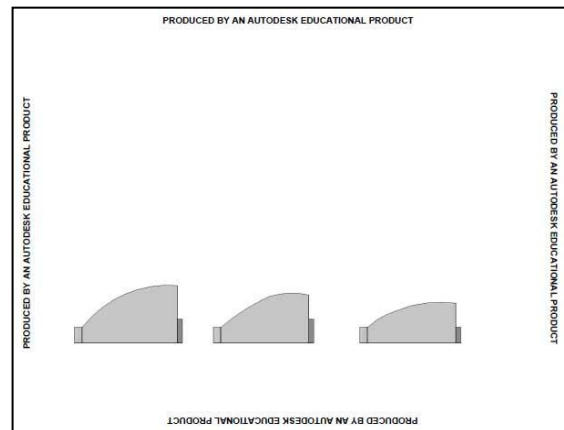


Figure 4: Frontal view of HK Retractors.

DISCUSSION

Oral surgical procedures sometimes are associated with local complications related to the instruments used in such procedures. We at the Department of Oral and Maxillofacial Surgery, College of Dentistry, King Saud University encountered many local complications such as soft tissue injuries or lip burning during some of the performed procedures. The retractors we use provide good soft tissue retraction but do not provide good soft tissue protection

during the surgical procedure. For a better understanding of our invention, reference should be made to accompanying drawing for the embodiment (Fig 1-4).

The new surgical retractor was made available in three sizes; small, medium and large for both sides the Right and the Left. The embodiment consist of three main part divided by angle of 92° (Fig. 1). The handle; it has a uniform measurements in all three sizes which was selected to be easy to handle and small as it is more comfortable to the surgeons hand.

1- Working part; its size differs from one size to other to fit different patients (Fig. 1-2). The curve measurement was selected depending on the French Curve³ Template for more accuracy and preciseness. This part aims to protect the inner surface of the cheek.

2- Flap reflecting end; it has a uniform measurement in all three sizes (Fig. 1).

Testing of the new retractor has been done at the Oral and Maxillofacial Surgery Clinics, College of dentistry, King Saud University. An evaluation form has been distributed to the surgeons after using the new retractor to evaluate it.

The trial period extended to a one month. Five Surgeons have used it within this period of time during their surgeries. Four surgeons agreed that the new retractor established better protection. While all of them agreed that it was easy to handle. One recommendation was suggested and it was related to the retractor edges in order to make the retractor more comfortable to the patient during surgery. The retractor's edges could be everted outside for better application and comfort on the patient's cheek and lip.

Recommendations

Further trial to be continued in King Saud Medical City, King Abdulaziz Medical City, Security Forces Hospital seeking the evaluation of Maxillofacial surgeons within the hospitals in Riyadh, Saudi Arabia.

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