Telescopic crown versus extra coronal attachment as retainer for distal extension bases

(strain gauge analysis)

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الفرق بين التاج المتداخل والرابطة الدقيقة الخارجية كمثبتات لحالات الاطقم الجزئية للمجموعة الاولى من تقسيم كينيدى: دراسة تحليل الجهد

رسالة مقدمة لقسم الاستعاضة الصناعية بكلية طب الأسنان

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الملخص العربى

إن الحفاظ على صحة الأسنان الطبيعية المتبقية وصحة الفم يجب أن يكون من الأسس التى يبنى عليها تصميم الأطقم الجزئية المعدنية المتحركة.

تهدف هذه الدراسة إلى تقييم و المقارنة للضغوط الناتجة من التيجان المتداخلة و لتثبيت الأطقم الجزئية ذات الامتداد الوحشي حالات الطائفة الأولى لتصنيف كنيدي على ان يكون الضرس الخدى قبل الطاحن الاول كونه اخر ضرس داعم للحالة.

بناء النماذج:

استخدمت نموذجين متشابهين لحالات الطائفة الأولى لتصنيف كنيدي للفك السفلى التي يكون فيها الطاحن الامامى الثاني و الطاحن الأول و الطاحن الثاني مفقودين, لعمل هياكل معدنية متشابهة في كل مكوناتها ماعدا مشابك التثبيت.

حيث كان التيجان المتداخلة المشبك المستخدم للنموذج الأول,) المشبك المستخدم للنموذج الثاني.

يتم تعديل النماذج مرونة الأغشية المخاطية والأربطة السنية فى هذه النماذج يتم تصنيعها بنفس التصميم مع إختلاف المسبتات المباشرة المستخدمة .

يتم تصميم السرج الخلفى للطاقم الجزئى هو كونه من شبكة لتغطية السرج الخلفى مع عارضة لسانية وذلك لربط المكونات .

تحليل الاجهاد:

يتم قياس الاجهاد عن طريق وضع المقياس على مواضع مختارة فى النماذج المستخدمة للحالات و ذللك لقياس الاجهاد و متابعة تأثير القوى على الاسنان الداعمه و عظام الفك.

تستخدم اداه خاصع وذلك لغرض توقيع قوه رآسية واسعة المجال بطريقه ثابته على المواضع المختارة فى النماذج المستخدمة وتكون القوة الواقعة فى كل مرة بنفس المقدار وبنفس

Introduction

Distal extension base removable partial dentures exhibit composite type of support which leads to movement of the denture base under loading. This movement leads to transmission of high amount of stresses to the abutment teeth.

Many methods were proposed to control and distribute these stresses, among which the use of different retainers and splinting of the abutment teeth.

Forces transmitted to the abutment teeth in distal extension removable partial dentures are greatly influenced by occlusion and movement of the partial denture.

The degree and direction of the denture base movement are greatly influenced by the quality the supporting residual ridge, the design of the removable partial denture, and the extent of the forces exerted on the denture during function.

The generated forces as a result of partial denture movement are transmitted to abutment teeth through the direct retainer. It is well known biologic fact that forces directed parallel to the long axis of tooth are better tolerated by the abutment and Supporting structures than tipping or torque forces.

Several techniques have been introduced to control these harmful stresses, among which is recording of the supportive form of the edentulous areas, mesial placement of

the occlusal rest, using retainers exhibiting stress releasing action and using osseointegrated implant as posterior artificial abutment .

Often a tooth is considered too weak to be used alone as a partial denture abutment because of the short length or excessive taper of a single root or because of bone loss resulting in an unfavorable crown – root ratio. In such instances, splinting to the adjacent tooth or teeth is recommended to improve the abutment support. The two single rooted teeth serve as a multirooted abutment. The most common use of multiple abutments is splinting of two premolars or a first premolar and a canine.

Mandibular premolars generally have round and tapered roots, which are easily loosened by rotational, as well as by tipping forces. They are the weakest of the posterior abutments. Splinting may be accomplished with cast removable retainers or cast cemented restorations. The preferred from of permanent splinting is with two or more cast restorations soldered or cast together.

Telescopic crown and extra coronal attachment could be used as a retainer for distal extension cases with advantage of stress releasing action by permit movement to minimize stresses induced by partial on supporting structure

Laboratory studies are more accurate than those clinically performed. This is attributed to the possible teeth

mobility accommodated in the steps of denture construction, and due to the difference in mucosal compressibility during making impression. Besides it has been shown that the behavior of gingival mucosa is viscoelastic in nature, which means that deformation varies according to time and load. So the surface on which class I and II saddles lie is unstable.

Studies were not made in-vivo because, any valid test in-vivo would have to be repeated in the same mouth and under the same conditions with the same supporting teeth and mucosa, because in any group of patients, 1) Histological structures of the periodontal tissues vary from mouth to mouth, 2) The bone surrounding the roots may vary in consistency, thickness and height, and 3) the length and shape of the roots may be different. Because of these facts, it is certain that there are variances in the degree of mobility of teeth in different mouths.

In fact, these variables fluctuate even in the same mouth depending upon prevailing conditions such as; time of day, general physical condition of the patient, and physiochemical changes in the supporting structures from occlusal trauma. Because of these variables and since the experiments are concerned with measuring comparative values, it was considered more practical and more accurate to perform them in the laboratory.

Stresses induced in dental structures have been studied in-vitro by different methods including holographic interferometer, stereo photogrammetric, photo elastic techniques, and finite element analysis and. strain gauges

Using strain gauge analysis method, to evaluate and compare between extra coronal attachment and telescopic crown as a retainer for distal extension cases and, how can decrease to great extent the harmful effects of removable partial dentures restoring distal extension cases.

Review of literature

Distal extension removable partial dentures

Extension base removable partial denture is defined as" A removable partial denture that is supported and retained by natural teeth only at one end of the denture base segment and in which a portion of the functional load is carried by the residual ridge [(1)]

Removable partial denture (RPD) restoring a bilateral distal extension edentulous span (Kennedy class 1) is the most common clinical situation and is more frequently encountered in the mandible than the maxilla [(1)]

Distal extension removable partial dentures are supported by two structures that differ in their viscoelastic response to functional and Para functional loading [(2)] .The residual ridge is twenty –five times more displaceable than the teeth. Distal extension removable partial denture is subjected to vertical, horizontal, oblique and rotational forces . These forces may become adverse during functional and Para – functional activities. Rotational components of vertical tissue ward and tissue way forces result from lack of distal abutment. Horizontal forces are the result of vertical force applied to one side of the bilateral RPD and lateral movement of the mandible during mastication. While oblique forces result from a