

Dimensional accuracy of removable dies made from Pindex® system as a function of sectioning time

Mohammed Aleem Abdullah, BDS, MDS

تقترح المقالات المتوفرة على أن الجبس السني يتعرض للتمدد الموحد الخواص. ويبلغ التمدد هذه الأقصى (70%) خلال ساعتين بعد بدء المزج وتتابع القيمة تزايداً خلال الأربع وعشرين ساعة التالية. تشمل هذه الدراسة مقارنة تشوه الأبعاد الخطي لأجزاء الطبعة المتحركة المحضرة بنظام بريندكس والمجزأة خلال ثلاثة فترات زمنية تراوحت من ساعة ونصف إلى أربع وعشرين ساعة. تم تحضير تسعين طبعة من المثال الأساسي المصنوع من مادة الطبع سيليكون المتعدد الغينيل (ريبروسيل) والنوع الرابع من الجبس السني (إكساليبور). تمت تجزئة المثال الأساسي خلال ثلاثة فترات زمنية، ساعة ونصف وساعتين وأربع وعشرين ساعة بدءاً من عملية صب الجبس. تم تحديد المسافة الخطية بين الدعامتين بواسطة المجهر المتكامل ومقارنتها مع المثال الأساسي. أجري التحليل الاحصائي باستخدام تحليل أنوفا وبوست هوك ($\alpha = 0.05$). أشارت النتائج إلى أن التشوه الخطي نتيجة لتمدد الجبس لم يكن مهماً بعد ساعة ونصف (0.001) بالمقارنة بعد ساعتين وأربع وعشرين من صب الطبعة.

Existing literature has indicated that dental stone after mixing undergoes continuous isotropic expansion. The maximum expansion (70%) of dental stone occurs approximately after 2 hours from the start of mix and the value progressively increases in the following 24 hours. **OBJECTIVE:** This study compared the linear dimensional distortion of removable dies made from Pindex® system sectioned at 3 time intervals ranging from 1.5 hours to 24 hours. **MATERIALS and METHODS:** Ninety impressions were made of a metal master model with polyvinyl siloxane impression material (Reprosil) and poured in Type IV dental stone (Excalibur). The master casts were sectioned at 3 time intervals: 1.5 hours, 2 hours and 24 hours from the start of mix for the first pour. The linear distance between the two abutments were made with traveling microscope and compared with the master model. Data were analyzed with one-way ANOVA / Tukey post hoc test ($\alpha = 0.05$). **RESULTS:** The results indicated that sectioning the master cast of Pindex® system at 1.5 hours showed significantly less linear distortion due to expansion of the gypsum ($P < .001$), compared with those sectioned at 2 hours and 24 hours from the start of mixing stone for the first pour.

INTRODUCTION

The master cast with removable dies on which a fixed partial denture or implant supported fixed prostheses is fabricated must be accurate and dimensionally stable over time. However, the linear expansion of dental stone causes inaccuracy in the spatial positioning of the abutments from the oral cavity to the master cast.

Dental stone after mixing undergoes an initial phase of contraction followed by progressive expansion during the change from hemihydrate to dehydrate state.^{1,2} This phenomenon is both volumetric and linear. In a dental setting, a value is determined for linear setting expansion and an assumption is made that expansion is isotropic.³ Montignoni and Schoneberger⁴, and Heshmati *et al.*⁵

reported that the maximum expansion (70 %) of stone occurs approximately after 2 hours from the start of mix and the value progressively increases during the following 24 hours and gets essentially completed at 96 hours. The magnitude of expansion is related to the volume of mass of the cast.³ Thus, the greater the volume or mass of the cast, the greater is the linear expansion. For this reason, it is desirable to interrupt the continuity of expansion of the master cast by sectioning before 2 hours to reduce its volume and minimize progressive linear expansion.⁴

The time elapsing from the beginning of the mix of dental stone until the material hardens is known as setting time.¹ The minimum time allowed for setting varies from 30 minutes to 60 minutes. Most modern dental stone products reach

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Associate Professor

Department of Prosthetic Dental Sciences

College of Dentistry, King Saud University

Address reprints requests to:

Dr. Mohammed Aleem Abdullah

Department of Prosthetic Dental Sciences

College of Dentistry, King Saud University

P.O. Box 60169, Riyadh 11545, KSA

E-mail: doctoraleem@yahoo.com