Deformasi slot beberapa produk braket stainless steel akibat gaya torque kawat beta titanium = Slot deformation various stainless steel brackets products due to the torque force of beta titanium wire

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Abstrak

Latar Belakang: Deformasi slot braket Stainless Steel akan mempengaruhi gaya yang diaplikasikan kepada gigi sehingga menghambat pergerakan gigi dan memperlama waktu perawatan ortodonti.

Tujuan: Mengetahui deformasi slot braket dari lima merek braket yaitu 3M, Biom, Versadent, Ormco dan Shinye akibat gaya torque kawat Beta Titanium 0.021x0.025 inci dengan sudut puntir 45° dan besar gaya torque dengan sudut puntir 30° dan 45°. Penelitian juga bertujuan untuk membandingkan deformasi dan besar gaya torque antara kelima merek braket.

Metode Penelitian: 50 braket Stainless Steel Edgewise dari lima kelompok merek braket (n=10) dilem ke akrilik. Masing-masing braket dilakukan dua tahapan pengukuran yaitu pengukuran deformasi braket dengan menghitung rerata tinggi slot braket dengan mikroskop stereoskopi sebelum dan sesudah uji torque dan pengukuran besar gaya torque dengan alat uji torque.

Hasil: Analisa statistik menunjukkan terdapat deformasi slot braket pada kelima merek braket dengan deformasi permanen secara klinis pada braket Biom (2,79 μm) dan Shinye (2,29 μm). Besar gaya torque pada kelima braket dari yang paling besar yaitu 3M, Ormco, Versadent, Shinye dan Biom. Perbandingan deformasi slot braket dan besar gaya torque antara kelima braket adalah terdapat perbedaan deformasi slot braket antara kelima merek braket kecuali antara 3M dan Ormco dan Biom dan Shinye dan terdapat perbedaan besar gaya torque antara kelima braket dengan sudut puntir 30° (kecuali 3M dan Ormco) dan 45°.

Kesimpulan: Komposisi logam dan proses pembuatan braket merupakan faktor yang mempengaruhi terjadinya deformasi slot braket dan besar gaya torque. Proses pembuatan dengan metode MIM dan komposisi logam AISI 303 dan 17-4 PH menurunkan risiko deformasi.
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Background: Stainless Steel bracket slot deformation will affect force applied to teeth can impede tooth movement and prolong orthodontic treatment time.

Objective: To determine slot deformation of five different bracket brands namely, 3M, Biom, Versadent, Ormco and Shinye due to torque of Beta Titanium wire 0.021 x 0.025 inch with torsional angle of 45° and the amount of torque with torsional angle of 30° and 45°. The research also aims to compare the deformation and amount of torque between all five brackets brands.

Methods: 50 Stainless Steel Edgewise bracket from five bracket group brands (n=10) is attached onto on

acrylic. Bracket slot measurement are carried out in two stages, firstly deformation measurement by calculating average bracket slot height with stereoscopy microscope before and after application of torque and secondly, measurement of torque with a torque measurement apparatus.

Results: Statistical analysis shows that there are slot deformations on the five bracket brands with clinical permanent deformation on Biom (2,79 μm) and Shinye (2,29 μm). The amount of torque on the five bracket brands from the highest is 3M, Ormco, Versadent, Shinye and Biom. From correlation assessment between bracket slot deformation and amount of torque in the five brands, a difference is found in the deformation in the five brands except between 3M and Ormco and Biom and Shinye. There is a difference in the amount of torque between the five brands with torsional angle of 30° (except 3M and Ormco) and 45°.

Conclusion: Metal compositions and manufacturing process are the factors that influence the occurrence of deformation bracket slot and the amount of torque. Manufacturing process using MIM and metal compositions of AISI 303 and 17-4 PH reduce the risk of deformation.