A Study on the Fracture Strength of the Cement Gap

Woon Seon Kwak, Chung Jae Lee

Department of Oral Health Graduate School of Public Health, Dankook University, Shin Han University, Republic of Korea

This research is conducted for better clinical test of ZIRCONIA as we find out the fracture strength difference of Zirconia on cement gaps of FULL CROWN that made use of Zirconia which is somewhat being used in recent dental technology. We produced each nine of Zirconia Crown of Zirconia fracture cement gaps (0.03)A group, (0.05)B group, (0.08)C group on cement gaps by use of CAD/CAM, and compared the results. We could end up getting conclusions as following: There was fracture strength difference per cement gaps but no impact ($p < 0.05$). There was difference between 1.962 ± 0.259 from group A and 2.005 ± 0.367 from group B, but no impact ($p < 0.05$). There was difference between 1.962 ± 0.259 from group A and 2.478 ± 0.331 from group C, but it's hard to consider as an impact ($p < 0.05$). Because of the high pressure 0.08mm is fracture as well as Margin has a lot of empty space due to Gap for 0.08mm. To identify the difference between 0.08mm and 0.05mm, 0.08mm is selected as a Gap. Therefore when it come to use 0.05mm authentically 0.05 is quite practical to use as a Gap

Methods: We produced each nine of Zirconia Crown of Zirconia fracture cement gaps A group (0.03 mm), Bgroup (0.05 mm), C group (0.08 mm) on cement gaps by use of CAD/CAM, and compared the results. We could end up getting conclusions as following.

Material and Equipment	Product	Manufacture
CAD/CAM system	EXO CAD	Italy
3D Scanner	Medit	Korea
Milling Machine	Roland	Japan
Model	Nissin(DSIDP-500A-MF)	Japan
Zirconia	Brux	USA
Instron	UTM 4303	USA
Metal	REX IV ALLOY	USA

Group	All data			Data except min & max		
	N	M $\pm$ SD		N	M $\pm$ SD	
A	9	1.692 ± 0.259	b	7	1.930 ± 0.144	b
B	9	2.005 ± 0.367	b	7	2.075 ± 0.147	b
C	9	2.478 ± 0.331	a	7	2.478 ± 0.331	a
P*		0.004			<0.01	

*p-value by one-way ANOVA test.

abc: Same letter means no statistical difference by Duncan test

A: group with 0.03mm gap

B: group with 0.05mm gap

C: group with 0.08mm gap

Results: There was fracture strength difference per cement gaps but no impact ($p < 0.05$). There was difference between 1.962 ± 0.259 from group A and 2.005 ± 0.367 from group B, but no impact ($p < 0.05$). There was difference between 1.962 ± 0.259 from group A and 2.478 ± 0.331 from group C, but it is hard to be considered as an impact ($p < 0.05$).

Conclusion: Because of the high pressure 0.08 mm is fractured and Margin has a lot of empty space due to gap for 0.08 mm. To identify the difference between 0.08 mm and 0.05 mm, 0.08 mm is selected as a gap. Therefore when it comes to using 0.05 mm authentically 0.05 mm is quite practical to use as a gap.