The study of attractive force occurred in parallel installation of keepers on the coping. -The influence of the distance between two keepers-

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Introduction

In a choice of magnetic keeper, a shape of root is an important factor in deciding the size. Especially when a root cross section is flat, two small size of keepers arranged in parallel are applied to improve its retention. In the past study of this course, the attractive force of magnetic attachments arranged in a row has been examined, and the study shows that a parallel installation of keepers makes its attractive force much stronger than a single attachment does. This study shows that how the difference of each keepers' distance affects its attraction.

Objective

This study simulates the case that a root cross section of maxillary first premolar is flat and clarifies how the distance between the two keepers affects its attractive force as they are arranged in parallel to improve retention of a denture.

Materials and Methods

Table.1 Details of materials and machine

Materials and Machines			Manufacturer	Abbreviation
GIGAUSS	C300		GC	C3
FIXPEED		lot No.180726	GC	
Aron alpha (an adhesive)		lot No.8Y27Z	TOAGOSEI CO.,LTD	
Universal testing machine	EZ-Test		Shimadzu Corp.	EZ-Test
ISO tensile test jig				

Experimental methods

The distance between the each keepers: 0mm,1mm,2mm
From now on they are written as 0mm=0,1mm=1, and 2mm=2
3different experiment stands are made along with the distance of keepers
(Fig.1) (Fig.2)
Data processing methods

The attractive force of C300 was measured 5 times, and a standard value is based on the average. A theoretical value is 2 times of the standard value. Measurements were held 5 times in each experimental method, and an experimental value is based on the average. The obtained experimental value was statistically processed with statistical analysis software GraphPad Prism, and a significant level is 5% in both one-way ANOVA and Tukey's multiple comparison tests.

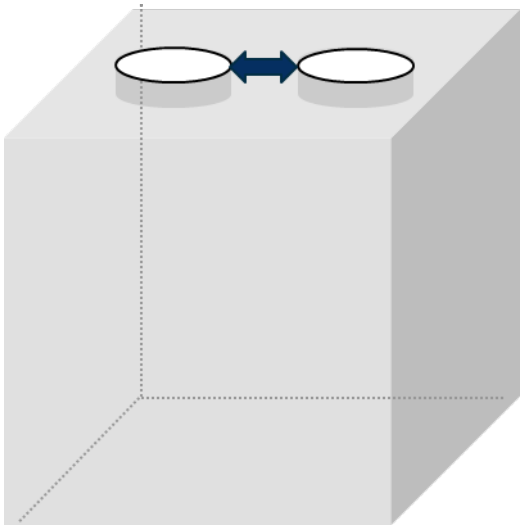

Fig.1 Sample image

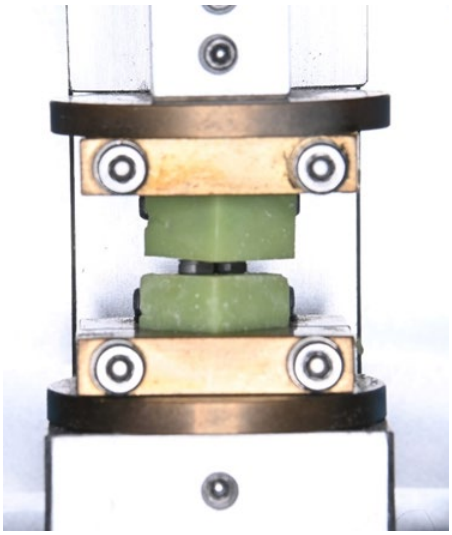

Fig.2 Universal testing machine with ISO tensile test jig

Results

The standard value of C300: 265gf
The theoretical value of C300: 530gf (two times of a standard value)
The average value of 0: 462gf The average value of 1: 387gf The average value of 2 :403gf (Table.2)

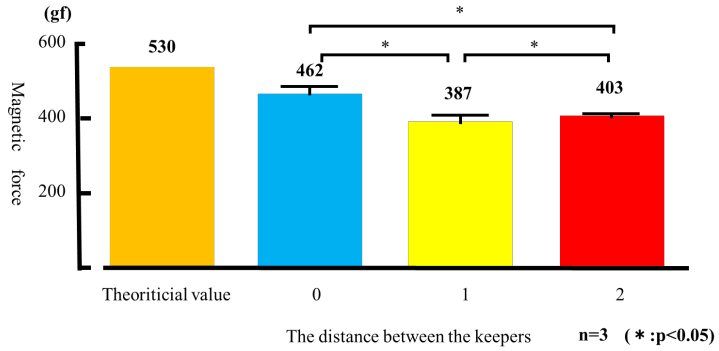

Table.2 The magnetic force of the two parallel installed keepers

Conclusions

The attractive force changes by the difference of the distance between the keepers. In the case of arranging keepers in contact, compared to the case of arranging them separately, the rate of decline of its attraction is small against the standard value.

References

1. Nakabayashi. S , Higuchi. N, Nagai. E, Sanada. j, Ootani. K, Ohyama. T, Yasuda. H, Tsukimura. N. A study of the attractive force of magnetic attachments on keepers mounted in parallel in a coping, J J Mag Dent 28(1):71-75, 2019.