Research on Precision by Upper Diameter of Implant Fixtures

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Abstract. This study carried out size dimensional test using the non-contact optical measurement instrument selecting regular size implant fixtures that have similar upper diameter among four different types of fastening methods processed surface with SLA. Size test result of implant fixture upper diameter of 4 kinds by each conclusion method, all test piece showed small variation less than standard size ± 1%, which is the exam specification standards, the Republic of Korea Food and Drug Administration medical devices, dental implant Dimensional test the permission of the norms standard size.

Keywords: implant diameter, implant Size, implant fixture

1 Introduction

There have been problems such as long period of treatment time, annealing phenomenon of implant fixture and abutment’s screw caused by problem of precision of implant processing equipment [1], implant fracture caused by mechanical strength of commercially pure Titanium Grade 3, repetitive of the bite force, marrow damage (bone loss) of surrounding implant fixture [2, 3, 4]. Various studies have been done to solve these problems, such as adapt of implant screwing point [5, 6], aimed to increase surface area on the surface of the mechanical strength [7] and now has been reported using the excellent grade of commercially pure Titanium 4. Various controversial points of this implant have been improved and the needs of prosthesis are increasing sharply.

The purpose of this study is to utilize by dental health data by investigating difference of indication size and actual size by carrying out size dimensional test using the non-contact optical measurement instrument selecting regular size implant fixtures that have similar upper diameter among four different types of fastening methods processed surface with SLA.
2 Research Methods

2.1 Test Methods

This study used four types of implants fixtures manufactured and sold in the Republic of Korea, aiming at regular size for similar each tightening system bone level (Height) (table1). Internal Hexagon connection Implant(A&B Implant, A&B Biomed, KOREA) of submerged type with morse taper of 1.5 ° and External Hexagon connection implant (YE Implant, Yesbiotech, KOREA) of submerged type, Internal hexagon connection Implant(YS Implant, Yesbiotech, KOREA) of submerged type with 11 ° morse taper, Internal octagon connection Implant(YI Implant, Yesbiotech, KOREA) of non-submerged type with 8 ° morse taper, the Implant fixtures (N=3) of 4 different kinds of fastening methods were targeted. Video Meter (VMS-1510, Rational, China), non-contact optical measurement instrument was used to the size measurement test for upper diameter of implant fixtures (Fig 1).

<table>
<thead>
<tr>
<th>Implant type</th>
<th>Ø</th>
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<tbody>
<tr>
<td>A&amp;B Implant</td>
<td>3.7</td>
</tr>
<tr>
<td>YE Implant</td>
<td>4.0</td>
</tr>
<tr>
<td>YS Implant</td>
<td>4.0</td>
</tr>
<tr>
<td>YI Implant</td>
<td>4.0</td>
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Fig.1. Implant size test using non-contact optical measurement instrument

2.1 Analysis of test results

This study used a statistical program SPSS ver. 18.0 to analyze the data of upper diameter measurement of 4 types of implant fixtures, and marked measured size value and standard size, average of each implant fixtures using graph. Each reference
specification dimensions of the medical device implant fixtures indicated the value using a tolerance of ± 1%.

3 Results

According to the result of the upper dimension Ø 3.7 mm test, the average of three Internal hexagon connection Implant fixtures test pieces(A&B Implant, A&B Biome, KOREA) of submerged type with 1.5° morse taper is 3.700 mm, and No. 1 and No. 2 are 3.701 mm, being measured as standard size most similarly (fig 2).

According to the result of the upper dimension Ø 4.0 mm test, the average of three External hexagon connection Implant (YE Implant, Yesbiotech, KOREA) fixture of submerged type is 3.999 mm, and No. 2 is 4.001 mm, No. 3 is 3.999 mm, being measured as standard size most similarly (fig 3).

According to the result of the upper dimension Ø 4.0 mm test, the average of three Internal hexagon connection Implant fixtures test pieces(YS Implant, Yesbiotech, KOREA) of submerged type with 11° morse taper is 3.997 mm, and No. 1 specimens is the largest as 4.01 mm and No. 2 and No. 3 are 3.99 mm. (Fig 4).
According to the result of the upper dimension Ø 4.0mm test, the average of three Internal octagon connection Implant(YI Implant, Yeshiotech, KOREA) of Non-submerged type with 8° morse taper is 4.003mm, and No. 1 specimens is 3.701mm, being measured as standard size most similarly (fig 5).
4 Discussion and Conclusions

This study got following sequence through carrying out size dimensional test using the non-contact optical measurement instrument selecting regular size implant fixtures that have similar upper diameter among four different types of fastening methods. All of upper dimension size accuracy of four types of implant fixtures are appropriate to the reference specification for dental implant device FDA standard size ± 1% by the Food & Drug Administration reference standard.

References