



ISO 13485



2011

Ufit[®] dental implant

FEM Analysis Comparison

A Study on the Analysis of Stress Distribution on Contact surface between Abutment and Fixture
in case of General Abutment and Sealing Abutment by Finite Element Method

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The Ufit[®] Dental Implant History.

- 2001 JULY** **Established T.STRONG (Manufacturer)**
Reported One year Clinical Experiments
- 2002 MAY** Registered Product Licensed by the Korea Food & Drug Administration (KFDA). Brand Name: UFIT
Registered Product Licensed by the Busan Regional Korea Food & Drug Administration
- 2003 SEPT** Recognition of Materials & Components Enterprise by MCT (Materials & Components Technology)
Certified ANSI/ISO/ASQ Q9001-2000. Certificate NO: 17162-QMS-2538
Contracted for Dental Implant Technical in cooperation with KOREA INSTITUTE OF MACHINERY & MATERIALS (KIMM)
- 2003 OCT** Applied Patent Registration for Torque Wrench Driver Adapter
- 2004 FEB** Applied Patent Registration for Dental Locking Abutment
- 2004 FEB** **Established T.STRONG INC. (Corporation)**
- 2004 MARCH** Acquired Patent Registration for Torque Wrench Driver Adapter (Registration No. 0345598)
- 2004 MAY** Acquired Patent Registration for Dental Locking Abutment (Registration No. 0350606)
- 2004 AUG** Participated in Gyeong Nam Regional Specialized Industry and Technology Development
(GYEONGNAM REGIONAL INNOVATION AGENCY, KOREA INSTITUTE OF SCIENCE AND TECHNOLOGY EVALUATION AND PLANNING)
- 2004 SEPT** Contracted for Dental Implant Technology in cooperation with KOREA INSTITUTE OF MACHINERY AND MATERIAL (KIMM)
- 2004 OCT** Signed an Agreement for Technology Development for the Removal of 3D (Difficulty, Dirty, Danger)
in Manufacturing (KOREA INSTITUTE OF INDUSTRIAL TECHNOLOGY)
Success of TRANSPLANTATION test for External and Internal Type Dental Implant System (KOREA TESTING AND RESEARCH INSTITUTE)
- 2004 NOV** Designated as a CLEAN place of business (Ministry of Labor)
- 2004 DEC** Received a Commendation for Medical and Pharmaceutical Product superiority and Good Example Enterprise
- 2005 JUNE** Signed an Agreement for Technology Development (CHANGWON UNIVERSITY)
- 2005 OCT** Acquired Product License (Grade:4) from the KOREA FOOD AND DRUG ADMINISTRATION (KFDA)
- 2006 APR** Selected as Top Company with Best Technology Innovation in Business and Brand Sector by Sports Seoul (LIFE Section)
- 2007 SEPT** Acquired Certification from KOREA GOOD MANUFACTURING PRACTICE (KGMP) (Certificate No.: MGK-537)
- 2008 JAN** Sealing Abutment Development
- 2009 SEPT** Sealing Abutment Application
- 2010 FEB** **Applied Domestic Patent for Sealing Type Abutment**
- 2010 JUNE** Registered Product License of Sealing Type Abutment and Launching
- 2010 JUL** Registered Product License of Hybrid Surface Treatment of Laser Neck Implant
- 2010 AUG** **Established UFIT Implant Inc.**
- 2010 NOV** Renewal of KGMP Certificate (Certificate NO: KTR-AB-090778)
- 2011 FEB** **Applied PCT Patent for Sealing Type Abutment**
- 2011 JUL** **Received Certified ISO 130485 License, CE Product License (GT2 Fixture)**
Established branches in Australia and The Philippines
- 2011 SEPT** **Received Domestic Patent for Sealing Type Abutment**



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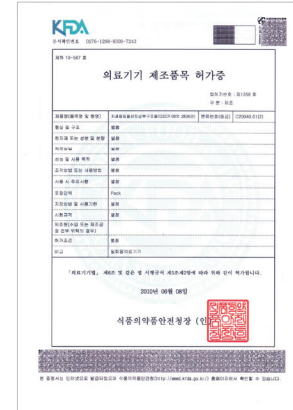
GMP Certificate



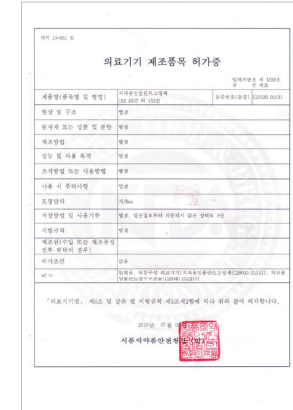
CE Certificate



Product License



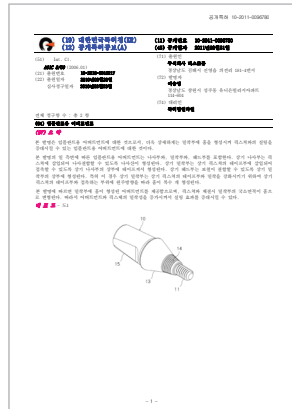
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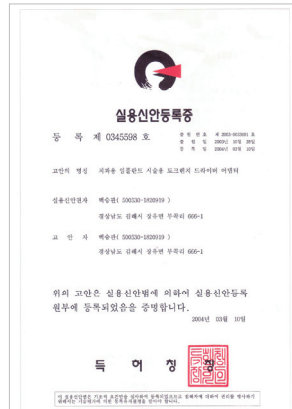
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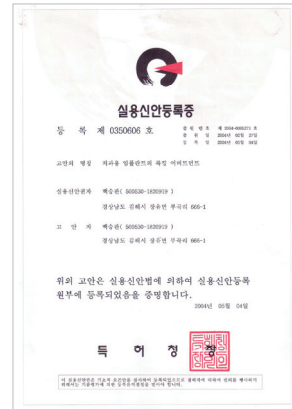
Domestic Patent



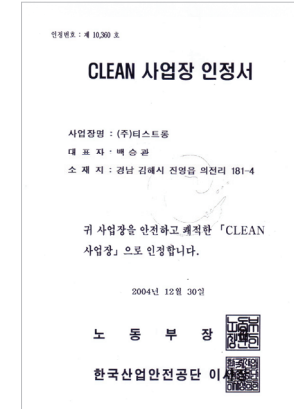
Patent Registration for Torque Wrench Driver Adapter



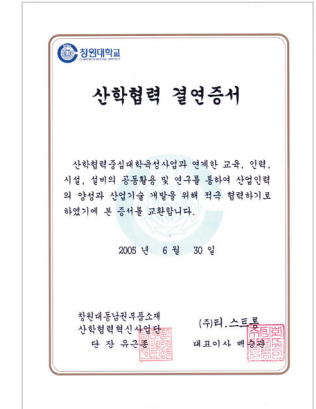
Patent Registration for Dental Locking Abutment



CLEAN place of business (Ministry of Labor)



Agreement for Technology Development (Changwon University)



INTRODUCTION

Of all the treatment method, implant surgery could be an easily available method for lost tooth replacement. From a patient's standpoint, they aspire for the best implant product and the best implant doctor to do the surgery. This is the aspiration of every implant surgery patients. Though not at the time being, the author would also like to receive surgery- later on when the perfect implant comes out. But unfortunately, there are many implants worldwide. The fact is that a fixed upper system would take a long time to be understood and used from the moment each implant is selected. The fact hasn't changed that the medical staff should have access to easy implant system, i.e. this system.

Conventional Implant System has two types. It can be divided into the External and Internal types. This study is only limited to the description of the Internal type. In the Internal type, the interior of the fixture has the inclined case and the vertically cylindrical case. This study is for the only for the technical side of the inclined case.

Implant patients from their dentist visit up to the completed fully functional time are subjected to several steps; first the fixture is inserted into the bone and a fusion appears then the top abutment is joined and the prosthetic is complete. Then chewing force is applied to the prosthesis, this chewing force dynamically impacts the combined abutment and fixture. Mechanically speaking, the most complete One-Body System has a lot of difficulty with treatment course and teeth structure so unavoidably a combined two-piece is used.

In this study, the abutment used among the internal types- a Taper with an 11 degree angle was studied.

Analysis was performed to the fixture and the abutment as the screw was tightened to 35N-cm, prosthesis raised and a 25kgf chewing force was added. This analysis method is each applied to the case of the Conventional Abutment and the Sealing Abutment. Applied stress and amount of deformation is calculated and based on the result, the direction of the Abutment's optimal design and structure is concluded.

01. Program Used: ANSYS V12.1

02. Mechanical properties of Titanium

<i>Density</i>	4,620g/cm ³
<i>Young' s modulus</i>	9,6 × 10 ⁴ MPa
<i>Poisson' s ration</i>	0,36
<i>Tensile Yield strength</i>	9,3 × 10 ² MPa (94,86kgf/mm ²)
<i>Compressive Yield strength</i>	9,3 × 10 ² MPa (94,86kgf/mm ²)
<i>Ultimate Tensile strength</i>	10,7 × 10 ² MPa (109,1kgf/mm ²)

(Unit : 10²MPa= 10.2kgf/mm²)

03. Mesh Generation

Nodes : 124,111 Nodes
 Element : 76,741 Elements

04. Boundary Condition

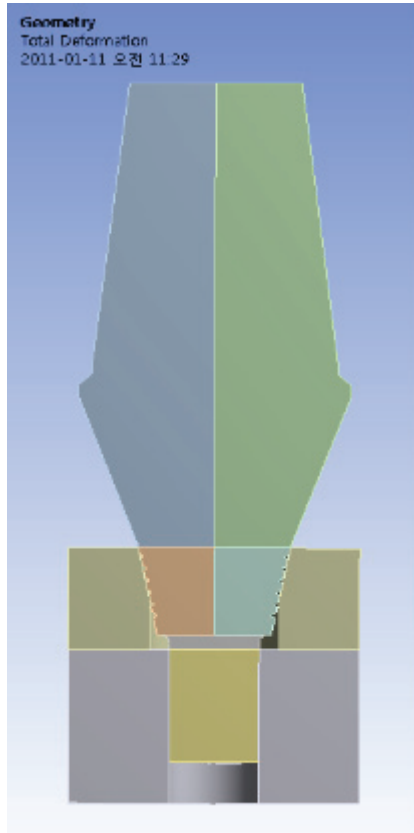


Fig. 1
Model of the whole picture

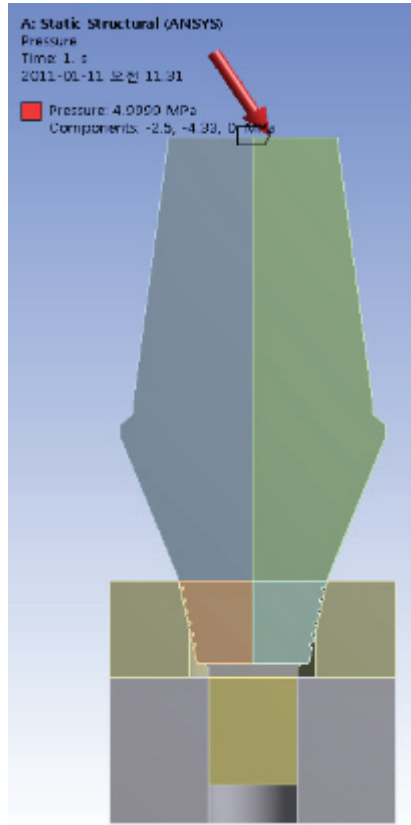


Fig. 2
5MPa 30 degree tilt pressure
(25kgf pressure is applied on top)

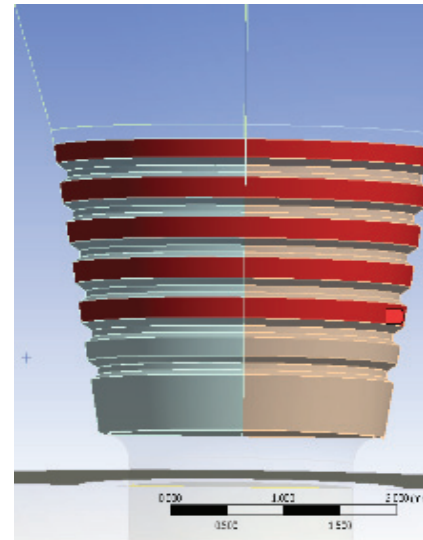


Fig. 3
Frictional Contact condition

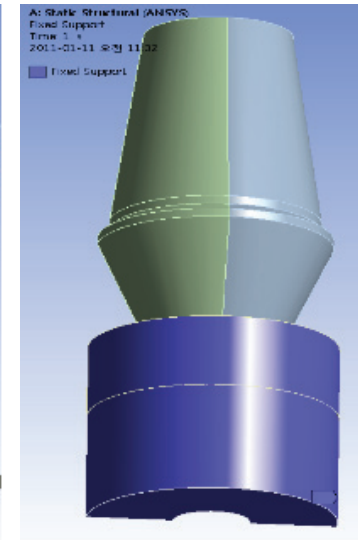


Fig. 4
Fixed support

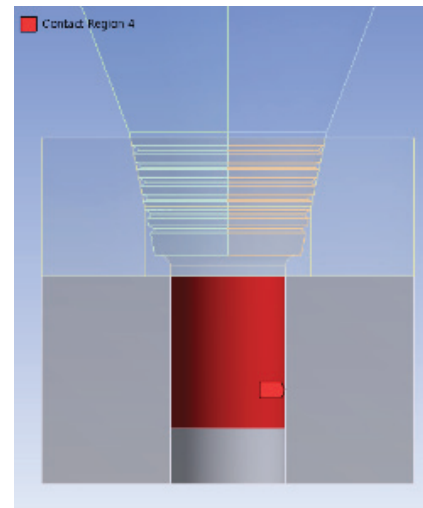


Fig. 5
Bonded Contact Condition

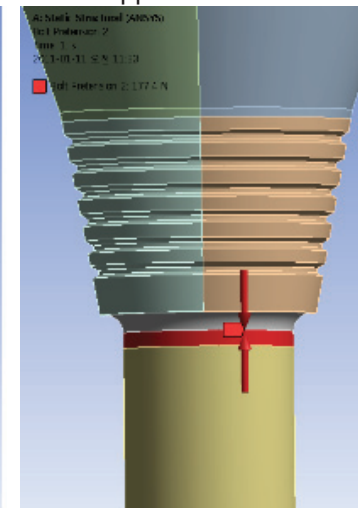


Fig. 6
Chewing Force Position (177.4N)
(35N-cm of Joining Torque Applied)

05. Analysis Condition

- (1) Case -Only Screw is joined with the Conventional Abutment
- (2) Case – Screw is joined with the Conventional Abutment then chewing pressure is applied on top with corresponding bending
- (3) Case -Only Screw is joined with the Sealing Abutment
- (4) Case - Screw is joined with the Sealing Abutment then chewing pressure is applied on top with corresponding bending

(1) Case -Only Screw is joined with the Conventional Abutment

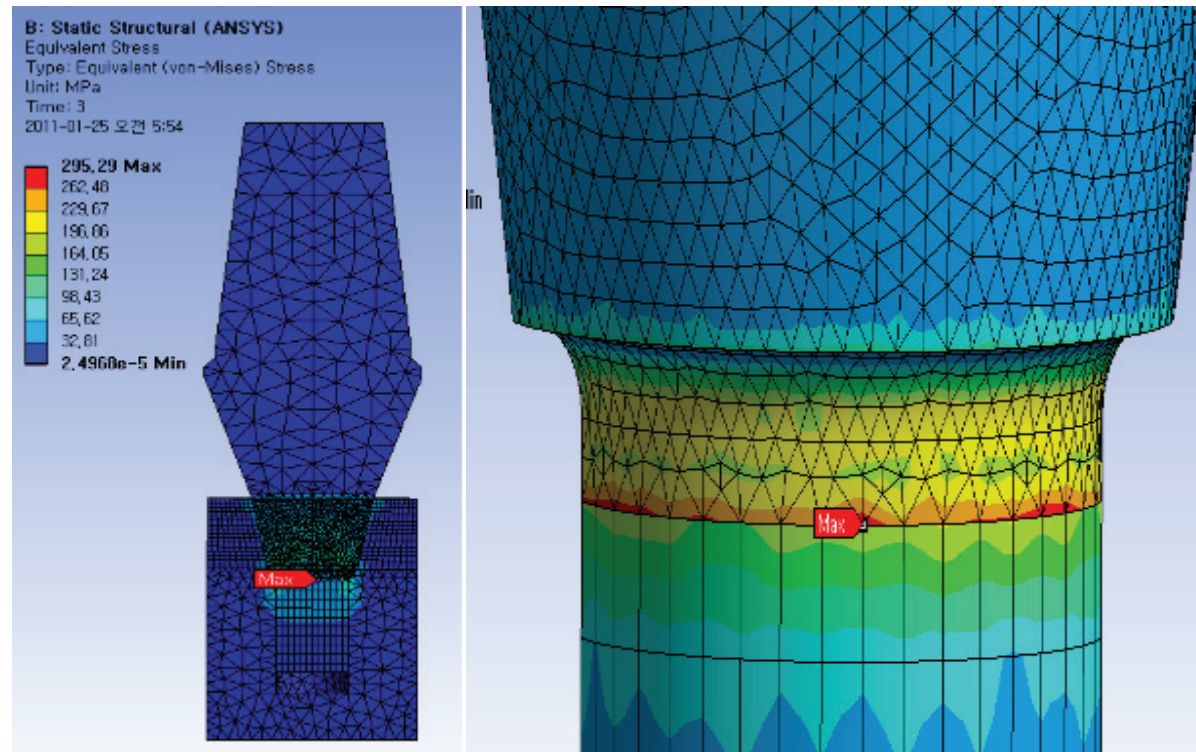


Fig. 7
Stress Result

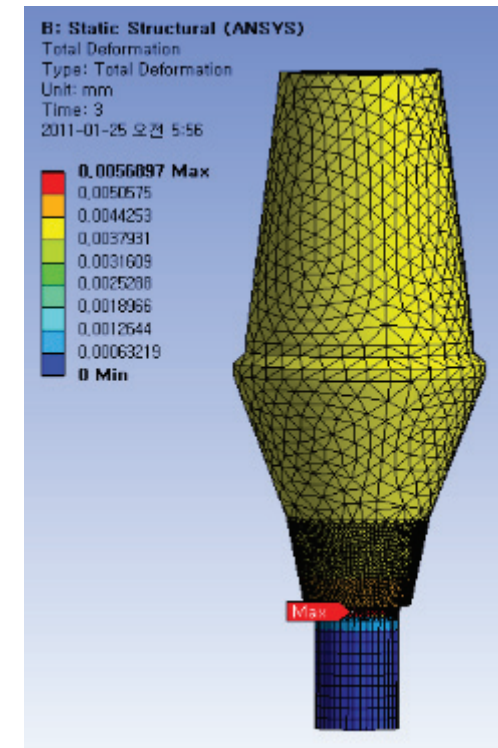


Fig. 9
Total deformation result

(2) Case – Screw is joined with the Conventional Abutment then chewing pressure is applied on top with corresponding bending

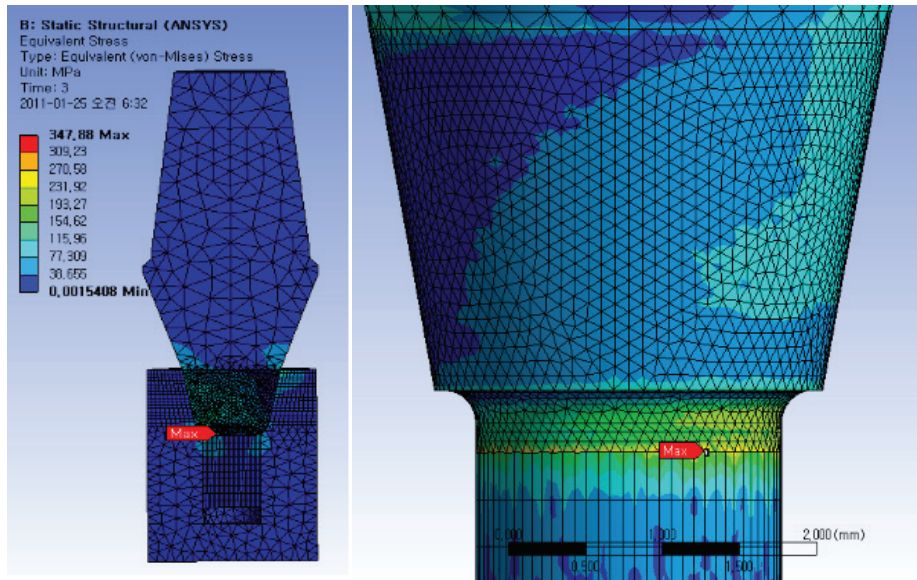


Fig. 10
Stress Result
(pretension load + bending)

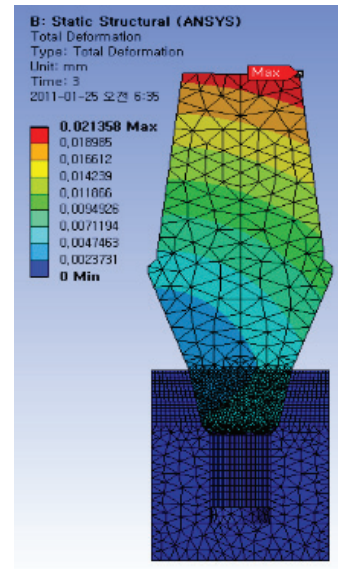


Fig. 12
Total Deformation

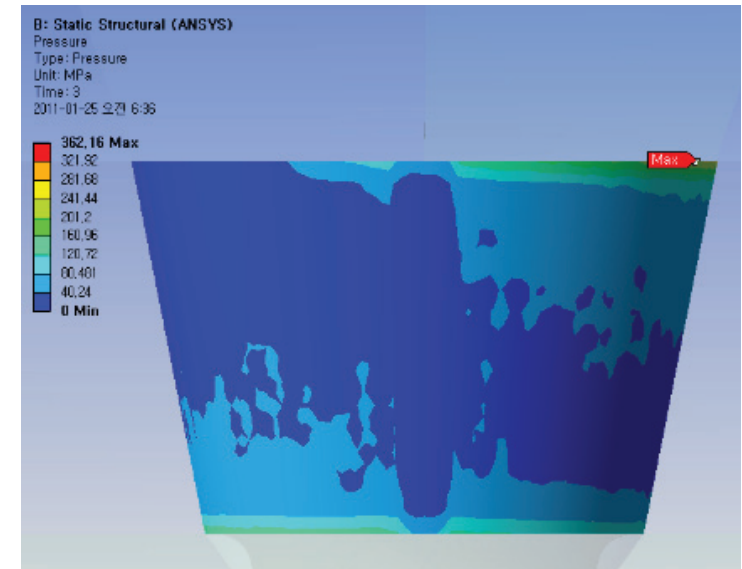


Fig. 13
Pressure (Pretension load + bending)

(3) Case -Only Screw is joined with the Sealing Abutment

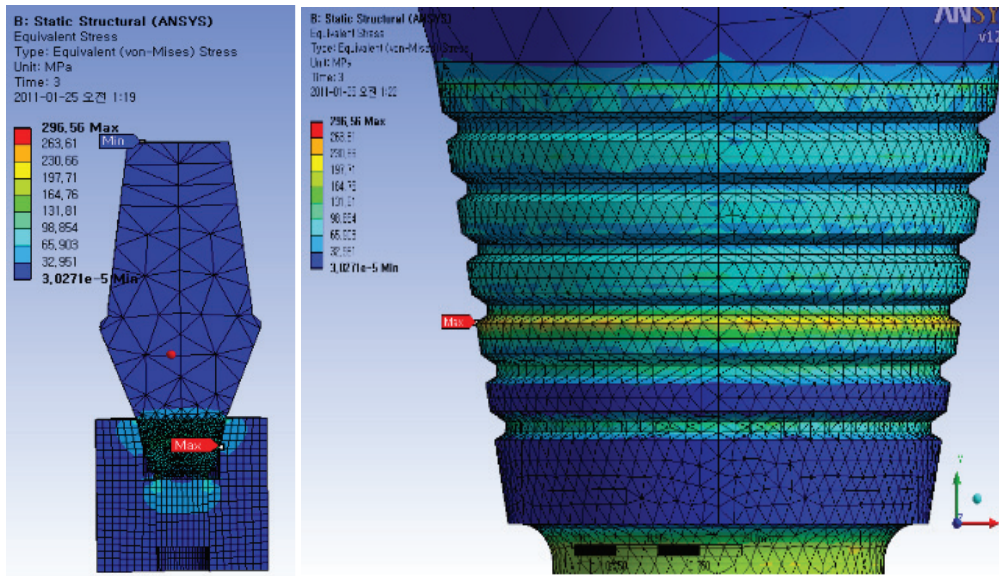


Fig. 14
Stress

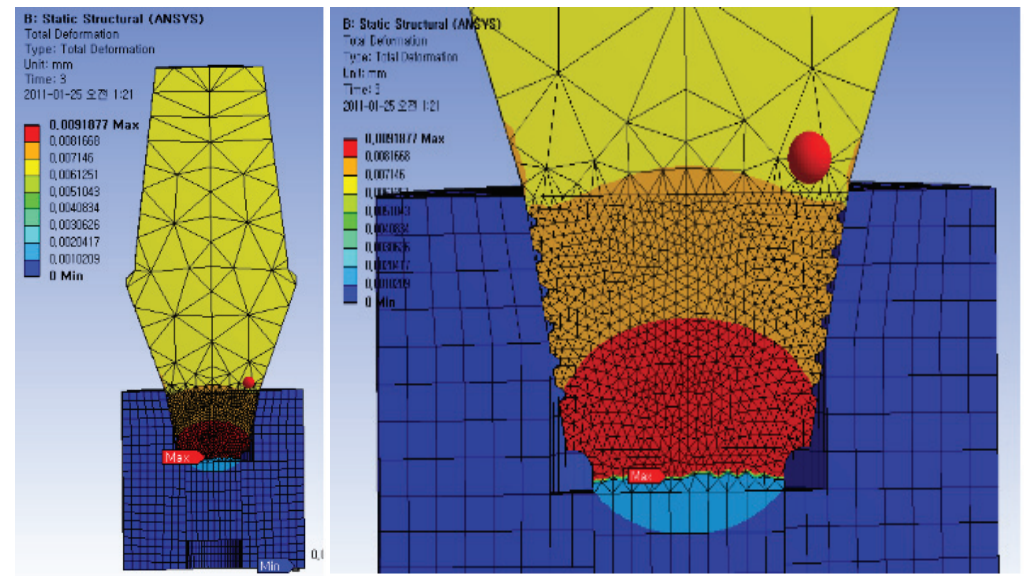


Fig. 16
Pretension Load Deformation

(4) Case - Screw is joined with the Sealing Abutment then chewing pressure is applied on top with corresponding bending

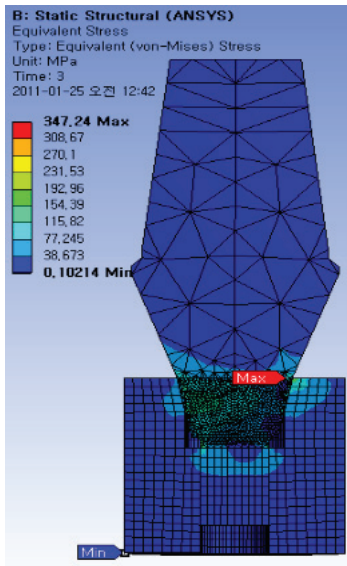


Fig. 18
Stress (pretension load + bending)

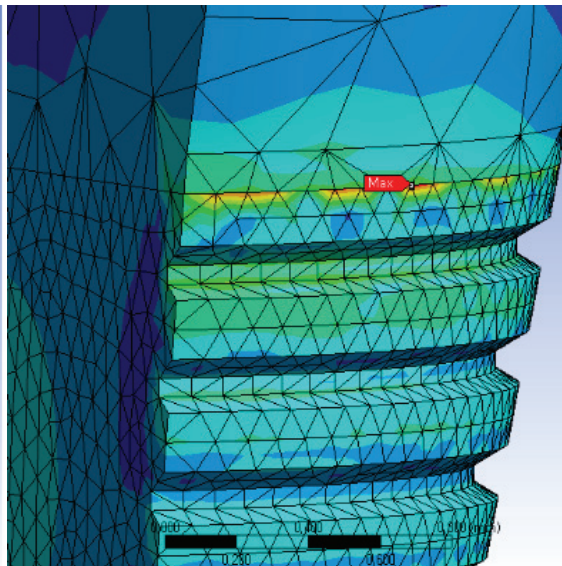


Fig. 20
Displacement
(Pretension load + bending)

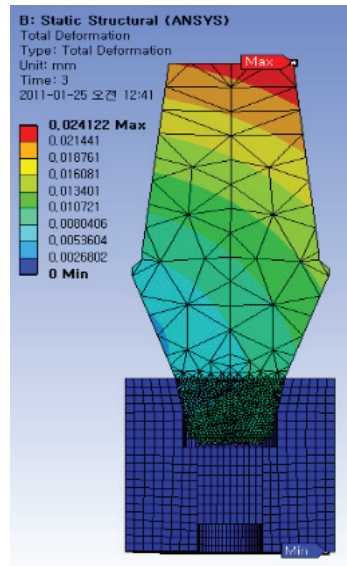
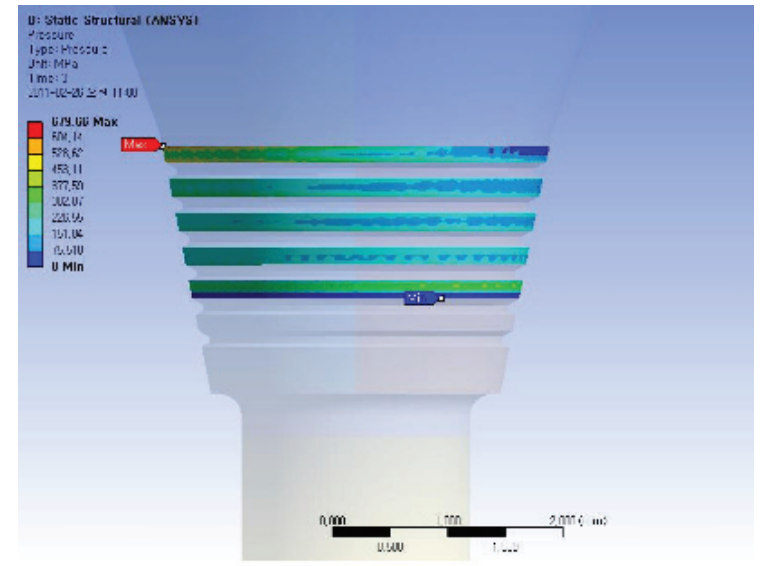


Fig. 21
Pressure
(Pretension Load + Bending)



A revolution in dental implant system.



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