Immediate loading
Immediate loading

2000  12  

2  3  6  7  8  9  10  11  12
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<td>5</td>
<td>5. Case Lorem Ipsum</td>
<td>14</td>
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<td>6</td>
<td>6. Submerged type Lorem Ipsum</td>
<td>16</td>
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<td>7</td>
<td>7. Case Lorem Ipsum</td>
<td>14</td>
</tr>
<tr>
<td>8</td>
<td>8. Submerged type Lorem Ipsum</td>
<td>15</td>
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</tbody>
</table>
Immediate loading

1. The immediate loading study was conducted using digital subtraction. A total of three cases were evaluated, with fully bone anchored prostheses in each case. The average implant threads were measured as 1.16 ± 0.15 mm and 1.84 ± 0.08 mm, with p < 0.05.

2. A comparison was made between immediate loading and conventional loading. In the immediate loading group, 3° and 12° angles were used.

3. In the submerged type, 3° and 12° thread were used. The average values were measured as 12°.

Immediate loading: 3°, 12°, 15°, 18°, immediately loaded cases.
Immediate loading

(1.1.112)
subtraction radiographic

digital subtraction

Jeffcoat\(^\text{2,22}\) noted that Brägger\(^\text{9,18}\) studied the effect of immediate loading on digital subtraction images. Immediate loading\(^\text{1}\) results in increased bone density and improved radiographic images. Immediate loading\(^\text{2}\) results in increased bone density and improved radiographic images. Immediate loading\(^\text{1}\) results in increased bone density and improved radiographic images.
II.  1.  2  3

1998  1  2000  2  9  3  8

Restored™ (Lifecore Biomedical, Chaska, U.S.A.)  24
Biohorizons® (Biohorizons Implant System, Alabama, U.S.A.)  8
Neoplant™ (Neobiotech, Seoul, South Korea)  12

Restore®  24

Biohorizons® RBM (resorbable blasted media), Neoplant®
machined  4m

Overload  3

Overload  3

Overload  1

91%  87%  (1)
<table>
<thead>
<tr>
<th>Arch</th>
<th>Case</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Restore (24)</td>
<td>Regular (23)</td>
<td>Restore (2)</td>
</tr>
<tr>
<td>Neoplant (12)</td>
<td>Type II (32)</td>
<td>Wide (21)</td>
</tr>
<tr>
<td>Biohorizons (8)</td>
<td>Type III (6)</td>
<td>Biohorizons (1)</td>
</tr>
<tr>
<td></td>
<td>Type IV (0)</td>
<td></td>
</tr>
</tbody>
</table>

*44% submerged type: 91%, submerged type: 87%.*

Immediate loading: submerged type: 91%, submerged type: 87%.
2. Methodology

XCP (extension cone paralleling) was used for the study. The paralleling technique (parallel, long cone technique) was performed with a bite block. The imaging was made with a 9° inclination. The X-ray source was 70 Kvp, 15 mA. The digital images were obtained using a Kodak DDP3000 scanner (DURR DENTAL XR24, Germany). The digitization was done with a slide scanner (Hewlet Packard ScanJet 4c) at a resolution of 600 dpi, 256 gray scale. The adobe photoshop program was used to digitize and manipulate the images.

Brain3.dsp (NosDIAtech, Seoul, South Korea) was used for the instruction. The images were aligned and merged with a 3D software program (Brain2).
1. Digital subtraction

Brain3.dsp 3, 6, 9, 12 thread. Reference image.
 target image 3, 6, 9, 12 thread. subtraction image.

thread thread peak valley.
À¸·ÎÀÓÇÁ¶õÆ®Á÷°æÀÇ thread 0.3 ¹è±îÁöÃøÁ¤ÇÏ¿´´Ù ¼öÁ÷ÀûÆò°¡¸¦À§Çشټ¸°³ÀÇ 0.3 ¹è±îÁöÀǰñ¹Ðµµ¸¦±Ù¿ø½ÉÀ¸·ÎÃøÁ¤ÇÏ¿´´Ù.

² 2. À¸·ÎÀÓÇÁ¶õÆ®¿¡Àµ²øÂ° thread ³ª 0.3 ¹è¿¬ÀåÇÏ¿©°ñ¹Ðµµº¯È­¸¦˚¨ÀóºÎ ³ªÀ§·Î°¥¼ö·Ï 0.3 ¹èÁõ°¡µÈºÎÀ§¿¡¼­À§·Î°¥¼ö·Ï 0.3 ¹è±îÁöÀµ²øÂ° thread. ¹æ»ç¼±»çÁø¿¡µµ °°Àº¹æ¹ýÀ¸·Î ±â·ÏÇÏ¿© À̹ÌÁöÈ­ ½Ã۰ í subtration (±×¸² 3- a). 3, 12 Áº ¿íÀ§¿¡µµ ·ÎÀ§Àµ²øÂ° thread (±×¸² 3- b). Àµ²øÂ° thread 0.3 ¹è±îÁöÀµ²øÂ° thread 0.3 ¹è±îÁöÀµ²øÂ° thread 0.3 ¹è±îÁöÀµ²øÂ° thread. ¹æ»ç¼±»çÁø¿¡µµ °°Àº¹æ¹ýÀ¸·Î ±â·ÏÇÏ¿© À̹ÌÁöÈ­ ½Ã۰ í subtration (±×¸² 3- c).
a. 

b. 

c. 

3. 

- 9 -
3°³¿ù°£°Ý 12°³¿ù°£ÀÇ ÁøÁ¤µÈ°ñÈí¼ö·®À»ºÐ¼®ÇÏ¿´´Ù. "Mann-Whitney U test" なら "Kruskal Wallis test" たちも 3°³¿ù°£ 12°³¿ù°£ ÀøÁ¤µÈ°ñÈí¼ö·®À»ºÐ¼®ÇÏ¿´´Ù. 0.05°ÍÀ§¿í ÀÌÇÏÀϰæ¿ìÅë°èÇÐÀûÀ¸·ÎÀ¯ÀÇ 0.05°ÍÀ§¿í ÀÌÇÏÀϰæ¿ìÅë°èÇÐÀûÀ¸·ÎÀ¯ÀÇ
III. Table 2

1. Table 1: 3, 6, 9, 12

<table>
<thead>
<tr>
<th></th>
<th>3°</th>
<th>6°</th>
<th>9°</th>
<th>12°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore</td>
<td>1.33±0.22</td>
<td>1.48±0.25</td>
<td>1.57±0.29</td>
<td>1.64±0.31</td>
</tr>
<tr>
<td>Biohorizons</td>
<td>1.22±0.07</td>
<td>1.41±0.07</td>
<td>1.49±0.07</td>
<td>1.52±0.04</td>
</tr>
<tr>
<td>Neoplant</td>
<td>1.12±0.36</td>
<td>1.25±0.34</td>
<td>1.33±0.36</td>
<td>1.44±0.38</td>
</tr>
</tbody>
</table>

2. Table 2: Neoplant, Restore, Biohorizons (mm), p > 0.05, 2, 4, 2, 4.
4. 

5. ±×¸² 4.°¢ÀÓÇÁ¶õÆ®Á¾·ùº°°ñÈí¼ö·®

³²³à°£°ñÈí¼ö·®ºñ±³¿¡¼­ 1³âÈij²ÀÚ´Â 1.61¡¾ 0.29mm , ¿©ÀÚ´Â 1.43¡¾ 0.72mm (p> 0.05 , Ç¥ 3, ±×¸² 5).

3. ¼ºº°¿¡µû¸¥ 1³â°£°ñÈí¼ö·® (mm ).

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>±×¸²</td>
<td>1.28±0.27</td>
<td>1.43±0.28</td>
<td>1.52±0.30</td>
<td>1.61±0.29</td>
</tr>
<tr>
<td>±×¸²</td>
<td>1.18±0.53</td>
<td>1.32±0.72</td>
<td>1.38±0.64</td>
<td>1.43±0.72</td>
</tr>
</tbody>
</table>

5. ±×¸² 5. ±×¸² 1³â°£°ñÈí¼ö·®

- 12 -
regular diameter: 1.55 ± 0.38 mm
wide diameter: 1.75 ± 0.17 mm
(p > 0.05, 4, 6).

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>6 mm</th>
<th>9 mm</th>
<th>12 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>1.22 ± 0.31</td>
<td>1.37 ± 0.33</td>
<td>1.46 ± 0.38</td>
<td>1.55 ± 0.38</td>
</tr>
<tr>
<td>Wide</td>
<td>1.38 ± 0.14</td>
<td>1.56 ± 0.15</td>
<td>1.67 ± 0.16</td>
<td>1.75 ± 0.18</td>
</tr>
</tbody>
</table>

Case: fully bone anchored: 1.84 ± 0.08 mm
1.16 ± 0.15 mm
(p < 0.05, 5, 7).
5. Case

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>±×</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial edentulous</td>
<td>1.43 ±0.11°</td>
<td>1.62 ±0.09°</td>
<td>1.74 ±0.08°</td>
<td>1.84 ±0.08°</td>
</tr>
<tr>
<td>Fully bone anchored</td>
<td>0.96 ±0.23°</td>
<td>1.05 ±0.17°</td>
<td>1.09 ±0.27°</td>
<td>1.16 ±0.15°</td>
</tr>
</tbody>
</table>

a, b, c, d : Statistically significant difference between column(p<0.05).

Submerged type

- 14 -
6. Submerged type (mm).

<table>
<thead>
<tr>
<th>Type</th>
<th>3 mm</th>
<th>6 mm</th>
<th>9 mm</th>
<th>12 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submerged</td>
<td>1.03 ± 0.10</td>
<td>1.33 ± 0.67</td>
<td>1.45 ± 0.07</td>
<td>1.59 ± 0.08</td>
</tr>
<tr>
<td>Immediate</td>
<td>1.33 ± 0.21</td>
<td>1.48 ± 0.25</td>
<td>1.57 ± 0.64</td>
<td>1.64 ± 0.72</td>
</tr>
</tbody>
</table>

*: Statistically significant difference between columns (p<0.05).
2. Digital subtraction image

3, 6, 9, 12 subtraction

Digital subtraction image 3, 6, 9, 12 subtraction, thread (1-4).

- 16 -
IV. 

Brånemark protocol immediately following surgery was used in immediate loading. Bobyn et al. 37, Pilliar et al. 150 have reported implant survival rates of 91% at 2 years and 87% at 4 years after one-stage titanium plasma sprayed screw implant placement. Immediate overdenture loading was used by Laerum et al. 29. Babbush et al. 1980 used immediate loading for immediate overdenture implant placement. Buser et al. 150 have reported similar survival rates to other implants.

Tarnow et al. 1 used an immediate loading approach for type I and II screw implants. Schnitman et al. 40, Salama et al. immediately loaded implants met the criteria for mini-implants. Microinterlock, microinterlock (surface coating), cantilever type I, II, type III implants were immediately loaded. Immediate loading was used for 91% survival at 2 years and 87% survival at 4 years.

Newman et al. 23, 40 reported 2-year survival of 91% and 87%.
immediate loading of a fully bone anchored prosthesis was implanted immediately after
Brunski et al. 100 showed micromotion of 300 ± 100μm. Micromotion was measured on day 14. Cameron et al. micromovement of the bone plug was measured on day 16,17. Macromovement was defined as 100° of micromovement. Cameron et al. immediate loading of a fully bone anchored prosthesis was implanted immediately after
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immediate loading of a fully bone anchored prosthesis was implanted immediately after
Immediate loading 1–3. 

Quirynen 3. 

Lindquist 25. 

Neoplant. 

Ericsson 39, Bernard 7.
fully bone anchored prosthesis  

- 20 -
structual noise] Structural noise is a type of noise that arises from the physical structure of the image. It can be caused by various factors such as graininess, noise in the scanning process, or noise in the image acquisition process. Digital subtraction images can be used to reduce the effect of structural noise. Digital subtraction image is an image that is obtained by subtracting two or more images. The images are typically acquired at different times or under different conditions. The subtraction process can help to reduce the effect of structural noise, as it can help to remove the noise that is common to all the images. The result is an image with reduced noise and improved contrast.
V. 

Immediate loading

1. 

Immediate loading

Immediate loading

1.16 ± 0.15 mm

1.84 ± 0.08 mm

(p < 0.05).

2. 

Immediate loading

Immediate loading

Immediate loading

12º

3. 

Immediate loading

Immediate loading

12º

1º

- 22 -


Abstract

A study of marginal bone resorption around implants after immediate loading

Sung Hyen Kim, D.D.S.
Department of Dental Science, Graduate School, Yonsei University
(Directed by Chong Hyun Han, D.D.S., M.S.D., Ph.D.)

Alveolar bone changes after immediate loading on implants up to one year were observed by means of standard intraoral X-ray measurement which were taken at 3 month intervals. At the same time, bone density changes were observed according to digital subtraction method which is a becoming a more and more promising diagnostic tool for implants.

Following results were obtained:

1. There was no significant difference in the amount of alveolar bone loss implant type, sex and implant diameter, but there was difference according to case selection; In fully bone anchored prostheses cases, bone loss was $1.16 \pm 0.15$ mm whereas, in partial edentulous cases, it was $1.84 \pm 0.08$ mm.

2. Alveolar bone loss after immediate loading showed a higher degree of bone loss than after submerged loading in the initial three months. But there were no significant difference at the 12th month.

3. According to the one year bone density change observation at the alveolar bone surrounding the implant, significant change was observed vertically, whereas no significant change could observed horizontally.
According to the above mentioned results, we can conclude that immediate loading of implants results in a higher degree of alveolar bone loss in one year than submerged loading. But since alveolar bone loss rate decreases to a reasonable rate after the initial 3 months of rapid bone loss, immediate loading of implants seems to be an acceptable treatment modality for patients with good bone conditions. Fully bone anchored cases showed an favorable outcome, but partial edentulous cases showed more bony resorption. So this cases considered in case selections. Bone density changes observation in the study was performed for only one year therefore a more longitudinal observation may be studied.

Keyword : Implant, Bone resorption, Bone density, Partial edentulous, Immediate loading
1. 3
2. 2
3. 3
4. 4
3.

4.