根尖性歯周炎に隣在するインプラントの予後

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Apical disease and the positioning of dental implants

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Dental implants are a very popular treatment in modern dentistry. Sometimes, implants have to be placed beside teeth with apical disease.

To investigate the influence of apical disease into the predictability of implants, we examined treatment documents of 182 patients that implant treatments were performed during 9 years from 1983 to 1992 at Kosei Dental Clinic (Chief; Takao Watanabe, Ichikawa, Chiba, Japan). There were 357 natural teeth neighboring these implants (Table 2). These consisted of 166 vital teeth and 191 non-vital teeth. Of the non-vital teeth, 18 showed a translucent area in dental X-ray photos, suggesting apical disease at the time of the implant placement. Of these 18 cases, three developed problems after the placement of an implant (Table 3).

Care should be taken to make sure that the distance between an implant and its neighboring tooth is more than 0.1mm on dental X-ray photo, especially if this tooth is non-vital with some apical disease remaining. In this study, infected teeth were treated in three ways, removal of the implant, the infected tooth and root canal treatment. After antibiotics, removal of implant or tooth extraction is the best choice in the case of acute infection, since it was found to remove the infection quickly. If there is no acute inflammation, root canal treatment can be used. (Scient. J. Jpn. Inst. Advanc. Dent, 9, 109-114, 2003)
Table 1: Types of implants

<table>
<thead>
<tr>
<th>インプラント</th>
<th>上部額</th>
<th>下部額</th>
<th>計</th>
</tr>
</thead>
<tbody>
<tr>
<td>アルセロン</td>
<td>2</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>パイオセロン</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>ITI</td>
<td>21</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>コアペント</td>
<td>25</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>計</td>
<td>220</td>
<td>253</td>
<td>473</td>
</tr>
</tbody>
</table>

Table 1: インプラントの種類

Table 2: Total number of teeth neighboring implants

<table>
<thead>
<tr>
<th>隣在歯</th>
<th>適合されており</th>
<th>適合されていない</th>
<th>計</th>
</tr>
</thead>
<tbody>
<tr>
<td>失活歯</td>
<td>173</td>
<td>18</td>
<td>191</td>
</tr>
<tr>
<td>生活歯</td>
<td>166</td>
<td>0</td>
<td>166</td>
</tr>
<tr>
<td>計</td>
<td>339</td>
<td>18</td>
<td>357</td>
</tr>
</tbody>
</table>

Table 2: インプラントの隣在歯数

Fig. 1: Method of counting neighboring teeth, and measuring distance between implant and apical infection.

No.1. Three teeth on one side of implant, total number of neighboring teeth is 1.
No.2. Three implants and two teeth on one side of implant, total number of neighboring teeth is 1.
No.3. Implant on either side of a tooth, total number of neighboring teeth is 1.
No.4. Teeth on either side of an implant, total number of neighboring teeth is 2.

The right upper image shows that the distance between a site of apical infection and an implant is measured from the edge of the infection (translucent area in x-ray) to the edge of the implant in cases where the radius of the infection is over 1 mm.

Table 3: Cases developing problems of neighboring apical disease

Case No.8 and No.9 showed symptoms of discomfort with no overlap or contact. The patients complained of discomfort although there was no x-ray evidence of contact of overlap between the implant and the tooth. Both cases showed evidence of infection from a translucent area in the dental x-ray photograph.

Case No.50 showed symptoms of discomfort overlap or contact. The patient complained of discomfort, in which the x-ray showed evidence of contact between a vital tooth and an implant.

<table>
<thead>
<tr>
<th>症例No.</th>
<th>年齢</th>
<th>性別</th>
<th>インプラント</th>
<th>隣在歯</th>
<th>透明感との距離</th>
<th>経過</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>67</td>
<td>男</td>
<td>パイオセロン</td>
<td>46</td>
<td>0.5mm</td>
<td>470疼痛→歯根拡大→インプラント除去→治療</td>
</tr>
<tr>
<td>79</td>
<td>66</td>
<td>女</td>
<td>ITI</td>
<td>34</td>
<td>0.5mm</td>
<td>340疼痛→歯根拡大→抜歯→治療</td>
</tr>
<tr>
<td>99</td>
<td>31</td>
<td>女</td>
<td>ITI</td>
<td>35</td>
<td>5.0mm</td>
<td>350疼痛→5の根尖周囲→軽快</td>
</tr>
<tr>
<td>50</td>
<td>39</td>
<td>女</td>
<td>ITI</td>
<td>34</td>
<td>生活歯</td>
<td>340不快感→4の根尖処置→軽快</td>
</tr>
</tbody>
</table>

Table 3: 不快症状が発現した症例

Table 4: Distance between artificial implant and apical disease.

In the 4 neighboring teeth with a distance under 1 mm (measured on the dental x-ray), there were 2 patients with 2 neighboring teeth of them, complaining of discomfort. In the 12 cases with a distance of apical disease of non-vital teeth and implants of over 1.0mm, there were no cases with symptoms of discomfort. The average distance was 3.3mm and the range was 0~8.0mm.

Table 4: 適合像とインプラントとの距離

Table 4, the current investigation of the implant's adjacent tooth and transparent tooth-to-tooth distance. The living tooth was 191 teeth, and the living tooth was 166 teeth, totaling 357 teeth. Since the tooth was a tooth, and the transparent tooth was identified as 18 teeth. Among these, 4
例において不快症状が認められた。

Table 3は不快症状をまとめたものである。失活歯3症例、生活歯1症例、合計4症例であった。失活歯では、3症例のすべてが腓骨洞鏡に経由してインプラントが植立されたもので、腓骨洞に発現した粘膜病変が拡大したものと考えられた。X線写真上での、病変とインプラントの距離をみると（Table 4）、インプラントから1mm未満の距離に病変が存在した症例が2例、3～5mmのものが1例であった。病変のみられた18症例での、病変とインプラントとの距離は平均3.3mmであった。

4. 症例提示

症例8（Fig.2-a～2-d）：67歳、男性
47欠損、バイオセラムインプラント植立、46と連結システム冠装着されたもので、46に根尖部透視がみられ、それとの距離は0.5mmであった。経過は46の病変が拡大し、インプラント周囲の歯周病巣、疼痛発現したため、47のインプラントを除去し、症状は軽快した。

症例79（Fig.3-a～3-d）：64歳、女性
34欠損、35に11インプラントを植立したもので、植立後、34の変性が拡大し、疼痛、腫脹があったため34を抜歯し、その結果、症状は消退した。

Fig.2-a,b: Case No.8 male, 67 years old. It showed an oral finding after removing the crown on the infected implant at the site of the second right lower molar. Swelling was observed at the right side of the alveolar ridge.
Fig.2-c: Case No.8. A dental x-ray photograph showed an apical disease at the site of the second right lower molar.
Fig.2-d: Case No.8. Pus was discharged from the implant socket after removing the implant.

Fig.3-a: Case No.79, female, 66 years old. An abscess was observed at the left side of the alveolar ridge.
Fig.3-b: Case No.79. An apical disease at the site of the second left lower premolar connects to the neighboring implant (ITI implant).
Fig.3-c: Case No.79. It is the dental X-ray photograph after extracting the infected premolar, showing the apical disease still.
Fig.3-d: Case No.79. It is a photograph taken 1 year later. The apical disease disappeared.
症例50：（Fig.4-a～4-d）39歳、女性
生活歯の症例で、35両Fタイプインプラント植立、術中34の根尖部を
損傷、レントゲン写真にてインプラントとの接触を確認した。経過は術後34
に疼痛、腫脹を発現した。デンタルX線写真にて34根尖部に透透過像をみたた
め、34の根管治療を行い症状は消退し
た。

Fig.4-a: Case No.50, female, 39 years old. It is an orthopantomograph soon after
placing two ITI implants at the sites of the second left lower premolar and the first
dmolar. It did not show any disease.

Fig.4-b: Case No.50. The patient started to
complain discomforts around the left lower premolar several days
later. The swelling was not clear. The x-ray photo showed a translu-
cent structure at the apex of the first
premolar.

Fig.4-c,d: Case No.50. It showed that an
instrument touching to the neigh-
boring implant(+c). The disease
disappeared a few months after
completing the root canal treat-
ment(+d).

5. 考察
インプラント治療が一般的になるに
つれて、インプラント周囲炎や歯周病
根尖病などの病変が発現する症例に遭遇することが多くなっている。根尖病
根尖部炎のような感染性病変の
場合、インプラントは影響を受ける
ことが十分に想定される。Ohは、根尖
部周囲炎をもつ46の歯根管を除去した
あとインプラントを植立したが、イン
プラント周辺にimplant periapical
lesionが発現、その結果、骨合計が
得られなかった1症例を報告した4)。

Yipは、インプラント周囲の根尖性
部周囲炎がインプラントの失敗を惹起す
る可能性を指摘し、その場合は、十分
にスペースを設けること、あるいは、
感染歯根を十分にシールするか、除去
すべきとしている5)。しかしながら、
インプラント周囲の根尖病変がイン
プラントにどのような影響を及ぼすの
か、また根尖部周辺のインプラントはど
の程度の距離を保っていれば安全圏と
いえるのか等に関する十分な報告はみ
られない。

今回、根尖病変とインプラントとの
距離を先述の基準に則ってX線写真上
で測定してみた。この結果（Table 4）、
1mm未満の距離であったものが4症例
みられ、このうち2例が不快症状を示
した例であった。しかしながら、2
5mmの距離がありながら不快症状を示
した例も1例（症例94）あった。この例
から、根尖部炎が発熱の場合は、
インプラントはかなりの根管を開けて
植立すべきかと思われた。これら不快
症状を生じ失活歯の3例症、イン
プラント周辺に根尖性歯周炎が発現
する可能性を考慮せずに同根尖に近接
してインプラント植立を行ったもので
あった。このうちの1症例にインプラ
ント除去に至ったが（症例8）、残りの
2例は、感染歯根を抜去することによ
って（症例79）、あるいは、根管治療
を施して（症例94）インプラントへ拡
大した病変を消退させることができた。
これら症例はインプラント植立
に際し、あらかじめ根尖部に根尖病変
が発現する可能性を考慮することの
重要性を認識させると同時に、歯根お
いは根管治療などにより原病変を除去
することでインプラントへの影響を最
小に抑える可能性を示したものと思
われた。

また、インプラント植立時に根尖生
活歯の根尖を損傷し、齒縁の壊死をお
こした原因と考えられる不快症
状の症例（症例50）あった。この例
では、術後に発和感が残り、腫脹に至
った。この時点で、根尖部の根尖部に透
透過像が現れたため根管治療を施行する
ことにより良好な経過を示すことがで
きた。インプラント植立後、根尖歯に
根尖病変が発生した場合、根管治療を
行うことは対処法として適応と思われ
た。

X線写真上でインプラントと根尖歯
が交差した症例が2例みられたが、こ
の中で不快症状があらわれたのは1例
（症例50）だけであった。他の例では、
埋伏歯の歯根側面を損傷していた症例
（症例89）が1例みられた。この症例
では不快症状がなく、インプラントは
現在（平成15年6月）でも機能してい
る。歯周組織を損傷しても、それが
破壊を担っている埋伏歯であり、歯
縁まで到達しなければ不快症状は起こ
らないものと考えられた。
Cases developing problems

In the first case (patient No.8, age 67, male), a alminous implant was placed (Fig.2-a,b). There was one neighboring, non-vital tooth, at the first lower molar position. Apical disease was present in this tooth. The distance between the implant and the site of apical disease was 0.5mm or less on the dental x-ray photo (Fig.2-c). After the implant was placed, the patient complained of pain and swelling around the implant area. An examination of the x-ray showed a translucent area, indicating apical disease. A course of antibiotics and sedatives was prescribed, and the symptoms disappeared. The implant was extracted leading to a discharge of pus (Fig.2-d). After removal, apical disease disappeared and the swelling subsided. In this case, removal of the implant was necessary because of acute inflammation.

The second case (patient No.79, age 66, female) had one non-vital second lower premolar neighboring the implant at a distance of 0.5mm or less. After the placement of two ITI implants, infection occurred around the second lower premolar. The patient complained of discomfort, swelling and pain (Fig.3-a). An abscess appeared, and the x-ray film showed disease in the apical area of the tooth (Fig.3-b). The previous root canal treatment had left some debris, which led to apical disease. The tooth was removed completely after which the infection disappeared completely (Fig.3-c and 3-d).

The third case (patient number 50, age 39, female) had two neighboring teeth, one close to the implant and the other at a larger distance (Fig.4-a). The closer tooth was the first lower premolar. Two ITI implants were placed next to the vital tooth. After a few days, the patient complained of discomfort and pain. Swelling around the tooth was not severe in this case. X-ray photographs showed overlap between the implant and the root of the tooth (Fig.4-b). The implant had been placed beside a vital tooth, and the x-ray showed a translucent area at the root apex. Disease was also detected in the tip of the implant. From this it was concluded that the implant had made contact with the tooth, leading to injury and infection. A root canal treatment was performed on the neighboring tooth (Fig.4-c and 4-d), leading to the disappear-

ance of the infection a few weeks later.

Discussion

In case No.8 and No.79, non-vital teeth had remaining disease from root canal treatments. In these cases, the distance between the tooth apex and the implant was 0.5mm. In case No.50, a vital tooth was infected from contact to an implant (as determined by overlap in the x-ray photograph). Out of the 18 cases with apical disease in non-vital teeth, 4 were less than one millimeter from the implant (Table 4). Of these, 2 cases went on to develop symptoms of discomfort. The other 14 cases, where the distance between the implant and the apex of the tooth was over one millimeter did not develop any symptoms of discomfort. This suggests that the distance between the neighboring tooth and the implant is important in determining whether infection occurs. The results show that the influence rate of cases where implants were placed 1mm or over from non-vital teeth going on to develop infection was 0%, while 50% of cases where the implant was under 1 mm developed an infection leading to problems. This leads us to believe that there is a high correlation between distance of implant placement from non-vital teeth and subsequent infection.

The case of patient No.50 was different, in that a vital tooth was infected after the placement of implants. In this case, infection was probably caused by the direct contact of the implant, not from stress caused on an already partially infected area.

Infected teeth were treated in three ways in this study, removal of the implant, removal of the tooth and by root canal treatment. After antibiotics, removal of implant or tooth extraction is the best choice in the case of infection, since it was found to remove the infection quickly. These approaches are not the top choice as it leads to the loss of a tooth or implant. The last choice is the root canal treatment. If there is no acute inflammation, this can be used. The root canal treatment can be performed with good results, but the implant can be kept.