

# The Status of Prosthetic Treatment in Korea and the Economic Evaluation on the Implant Prosthetic treatment and Bridge for Single Tooth Loss

## Introduction

The prosthetic treatment is a procedure which artificially produces tooth in case that a tooth is lost and includes the implant, bridge and dentures. The patients who lost one or two teeth may have the implant prosthesis or bridge treatment depending on the damages. The fully edentulous patients can choose among fixed implant-supported prosthesis, implant overdenture or complete denture. There are differences between the prosthetic treatment in complications, satisfaction, quality of life, cost, and management. Therefore, comparing the costs, survival rate of the prosthesis, complication rate, and quality of life after prosthetic treatment might help people in need of dental treatment make decisions.

## Objective

The purpose of the study is to provide information on choosing the treatment by examining the clinical performance and costs of the prosthetic treatment according to tooth loss. The specific research items are as follows.

- Prosthetic treatment status in Korea
- Oral health-related impact on quality of life(OHRQoL) for each prosthetic treatment
- Clinical outcome of each prosthetic treatment
- Economic evaluation of single tooth replacement: dental implant vs. bridge

# Methods & Results

Dependence Prosthetic Treatment Status in Korea: Korea National Health and Nutrition Examination Survey

The study utilized the data of the 4th Korea National Health and Nutrition Examination Survey(KNHNES IV, 2007- 2009) to examine the status of prosthetic treatment in Korea. The analysis showed that 7,437(27.2%) of 24,781 who took oral examination experienced prosthetic treatment at least once and the implants accounted for 2.7%(630). The number of patients who required additional prosthetic treatments was 3,322(12.9%)(Figure 1). Specifically, the age group between 40 and 69 years old showed 46.9% of prosthetic treatment, 4.9% of the implants and 20.2% of additional prosthetic treatments.

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\* %: weighted proportion

#### Figure 1. Characteristics of the patients by prosthetic treatment status : Age

Source: The Fourth Korea National Health and Nutrition Examination Survey

#### □ Survey on Oral health-related impact on quality of life for the prosthesis treatment

This study performed a survey to examine the OHRQoL in patients treated with the prostheses. The subjects aged 40-69 years who had received prosthesis treatments in dental clinics or hospitals at least the last six months ago were involved in this study. The group with single tooth loss consisted of the dental implant(n=31) and the 3-unit bridge(n=32), and the edentulous group consisted of the fixed implant-supported prostheses(n=29), the implant overdentures(n=27) and the complete dentures(n=30). The study measured the OHRQoL by using the oral health impact profile-14(OHIP-14) and showed that the limitation on the quality of life due to oral problems after the prosthetic treatment significantly reduced. In addition, it was found that the fully edentulous groups treated with the fixed implant-supported prosthesis or implant overdenture showed a significant improvement on the oral health related quality of life as compared to the complete dentures(Figure 2).





### $\hfill\square$ Systematic Review on the Clinical outcome of the Prosthesis Treatment

The purpose of this systematic review is to determine the survival rates of each prosthetic treatment for single tooth loss or totally edentulous patients(searching DB: Ovid-Medline, Embase, Cochrane, KoreaMed, KMbase, KISS). The study performed the meta-analysis for each single-arm study because there was no literature which directly compared the implant and bridge treatment for the patient group with single tooth loss. The number of implant literature was 19 for Korean DB and 41 for abroad DB and the bridge literature was 2 for Korean DB and 9 for abroad DB. The survival rates of implant for 4-6 years were 94.5% (95% CI: 92.5 - 96.5%) and for 7 - 10 years were 91.7% (95% CI: 85.0 - 97.4%) and the rates of bridge were 84.2% (95% CI: 69.7 - 98.6%) for 4-6 years and 81.3% (95% CI: 71 - 89.1%) for 7-10 years. The result for the single-arm studies showed that the implant survival rate was higher than the bridge but the caution is required because the result was not from direct comparison.

There was no literature on the edentulous group which simultaneous compared the implant-supported fixed prostheses, implant overdentures and the complete dentures. The total number of literatures which compared 2 out of 3 treatments was 4. As a result of meta analysis, the survival rates derived from 4 head to head trials were 97.8%(95% CI: 96.9 - 98.9%) for the implant-supported fixed prostheses and 92.5%(95% CI: 85.7 - 99.3%) for the implant overdentures. The study performed the meta analysis by adding 25 single-arm group studies and showed that the survival rates of the implant-supported fixed prosthesis for 4-6 years were 98.4%(95% CI: 97.2 - 99.5%) and the implant overdentures were 93.3%(95% CI: 91.5 - 95%), meaning that the survival rates of the implant-supported fixed prostheses were higher compared to the implant overdentures. Meanwhile, there was no literature which reported the survival rates of the complete dentures.

#### □ Economic evaluation of single tooth replacement: dental implant vs. bridge

The economic evaluation compared the implant and the bridge among the patients who single tooth loss. The patient survey showed that the cost of a dental implant was \$1,616 in a clinic and \$2,708 in a hospital, and the cost of a bridge was \$1,308 in a clinic and \$1,805 in a hospital. The costs for time and transportation were considered as well as medical costs. The clinical effects of the prosthetic treatment utilized systematic review results and a survey was performed on clinical experts for the rates of side effects. The analysis showed that dental implants cost \$251(clinic) to \$325(hospital) more than three-unit bridges, and had survival rates that were 10.4% points higher. The incremental cost-effectiveness ratio was \$2,414 in a clinic and \$3,126 in a hospital for a prosthesis preserved for 10 years.

## Limitations

The limitations of the study are as follows. First, the study limited the patient group for analysis to ensure the patient homogeneity. Therefore, the study failed considering the partially edentulous patients who accounted for most patients. However, it was meaningful in the edentulous prosthetic treatment because the implant prosthesis and bridge treatments were also performed for partial edentulous patients. Second, the level of evidence for effectiveness is low because no head-to-head trials have compared single tooth implants and three-unit bridges. Therefore, this study is limited in evaluating the clinical superiority between implants and bridges. Third, the economic evaluation in this study did not consider all aspects of a single-tooth implant or bridge, such as satisfaction. The ability to treat regardless of the condition of surrounding teeth and without damaging adjacent teeth is the main advantage of implant treatment, and aesthetic advantages are not reflected in the economic evaluation.

### Conclusions

It is important for the patients who lost tooth to choose dental prosthetic treatment based on the oral status considering the survival rates, satisfaction, complication, treatment cost and period of the prosthetic treatment. However, it was limited for comprehensive conclusion due to insufficient data and evidence because there was almost no study which directly compared clinical effects among prosthetic treatments. The study was conducted to provide information from various aspects using accessible data source. This study will help choose the best treatment option in patients in need of prosthetic treatments.

## References

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| Lost single tooth  |                           |
|--|---------------------------|
| <b>Single tooth implant prosthesis</b><br>It transplants artificial tooth and a fixed prosthesis by covering the prosthesis shaped like tooth af-<br>ter planting the implant for the lost single tooth  |                           |
| <b>Bridge</b><br>It is the fixed prosthesis which carves nearby teeth around the lost tooth and forms a tooth on the<br>lost tooth like bridge   |                           |
| Complete edentulous  |                           |
| <b>Fixed implant prosthesis</b><br>It is made by planting the implant on the lost tooth and connecting the prosthesis shaped as the<br>tooth. It is fixed prosthesis which may not be removed by the patient                                       |                           |
| <b>Temporary implant prosthesis</b><br>It is a method by planting a small number of implants and maintaining the dentures connecting<br>between the implant and the dentures. It is a temporary prosthesis which may be removed by the<br>patients |                           |
| <b>Complete dentures</b><br>Only made with dentures without the implant<br>It integrates the part with no tooth and is placed between the gum and the jaw bone for the patients<br>to remove   | Contraction of the second |