

Executive Summary

□ Prosthetic treatment status in Korea

This study was performed to investigate the current state of dental prosthetic treatment (fixed prostheses, removable prostheses, implant prostheses) and unmet needs for prosthetic treatment in Korea.

The data from the Fourth Korea National Health and Nutrition Examination Survey (KNHANES IV 2007-2009) was utilized. To determine the characteristics of various prosthetic treatments, the proportion of people with the conventional prosthetic treatment and implants, as well as the demanding prosthetic treatment was estimated through the results of oral examination.

It was found that the 27.2% of the Korean population experienced prosthetic treatment at least once, 2.7% had implants, and 12.9% were in need of further prosthetic treatment. The proportions of those who have any kinds of prostheses or implants were higher in women compared to men, and the demand for prosthetic treatment increases with age. Specifically, in the subjects aged 40-69 years, 46.9% experienced prosthetic treatment, 4.9% had dental implants and the need for prosthetic treatment was 20.2%. While the conventional prosthetic treatment ratio was found relatively higher in the poorly educated, low-income socioeconomic classes, the survey showed those who highly educated and have high income tend to have more implants. The main causes of unmet needs were related to economic reasons and it comprised 58.5%.

The proportion of people with prosthetic treatment is increasing in Korea however the unmet need of prosthetic treatment is still high due to economic reasons.

□ A survey with general people and patients

A survey was conducted to the general people and to patients that had undergone prosthetic treatment, to examine satisfaction with each dental prosthesis, quality of life related to oral health, treatment costs and unmet medical need for prosthetic treatment. 27.63% of the 152 people who participated in the survey were found to have had prior prosthetic treatment. Within the group with prior prosthetic treatment, those who had bridges were found to be the highest (52.38%), followed by single-tooth implants (23.81%), and partial dentures (16.37%). Additionally, unmet needs rate for prosthetic treatment was 39.62%, in which 13.21% were treated later than necessary, and 24.5% had not yet received treatment. To identify the factors that influence the unmet need for prosthetic treatment, demographic and social factors, treatment necessity factors, and health behavior factors were selected as variables for a logistic regression analysis. The results showed that the family income as well as the presence of oral disease had statistical significance in the unmet need for prosthetic treatment. A survey for patients with dental prosthesis included patients who, between ages 40-69, have elapsed a minimum of 6 month period after their prosthetic treatment. Patients with single missing tooth were categorized into those with a dental implant and those with a bridge. Edentulous patients were dividing into three categories - implant-supported fixed prostheses, implant supported removable prostheses, and complete dentures. Patients with single missing tooth were comprised of 31 patients who had received dental implants, and 32 patients who had received the bridge treatment, for a total of 63 patients. Edentulous patients included 29 with implant-supported fixed prostheses, 27 with implant-supported removable prostheses, and 30 with complete dentures, for a total of 86 patients. The satisfaction difference with prosthetic treatment for single tooth loss was not statistically significant. For edentulous patients, the satisfaction with prosthetic treatment was the highest in those with implant-supported fixed prostheses, followed by implant-supported removable prostheses and then completes dentures. The major reason of dissatisfaction

in dental implants, implant-supported fixed prostheses, and implant-supported removable prostheses was the high costs, while in bridges, most of respondents expressed dissatisfaction with damaging healthy teeth for treatment. Those who were treated with complete dentures mentioned discomfort of the dentures as the highest source of dissatisfaction (83.3%).

Additionally, the quality of life related to oral health was measured using the Oral health impact profile-I4 (OHIP-I4). The oral health quality of life was significantly increased after prosthetic treatment for all the sub-scales of OHIP-I4. For patients with single tooth loss, difference between bridge treatment and implants on oral health related quality of life was not statistically significant. Edentulous patients showed only a minimal difference between implant-supported fixed prostheses and implant-supported removable prostheses, but complete dentures showed significant differences from the other two types of treatments.

Analysis of treatment costs showed that the median cost for a single tooth implant was 1,790,000 Korean won in clinics, and 3,000,000 Korean won in hospitals. Median cost for bridges were 1,150,000 Korean won in clinics and 2,000,000 Korean won in hospital, revealing higher hospital costs to be statistically significant. In the case of edentulous patients, the median cost for implant-supported fixed prostheses in the lower jaw was 11,500,000 Korean won in clinics and 24,500,000 Korean won in hospitals, showing statistically higher costs in hospitals. Costs for implant-supported removable prostheses were found to be about 30% lower than fixed implants, ranging about 7,000,000 Korean won in clinics and 15,000,000 in hospitals. Dentures of upper or lower jaw separately were about 2,000,000 Korean won, and about 4,000,000 Korean won for both jaws. For costs regarding complete dentures, analysis showed significant differences depending on the location of dental prosthesis.

□ A systematic review of the 5-10 year survival rates with implant and bridge (3-unit FPD) in patients with single tooth loss

Patients with single tooth loss can be rehabilitated with implant prosthesis or bridge. Systematic review was performed to determine the survival rate of these dental prosthetic treatments and the change in quality of life according to treatment option.

The electronic search was conducted to identify randomized clinical trials, prospective and retrospective cohort studies on survival rates with implant prosthesis or bridge. The databases were searched from Ovid-Medline, Cochrane library, EMBASE, and Korean DB with publication year limit from 1995 to 2011. The full texts to meet the inclusion criteria or to make a unclear decision, were obtained. Quality assessment of the identified studies and data extraction was performed independently by two reviewers. Survival rates were analyzed using random effect model to obtain summary estimates of 5 - 10 year survival rates.

The search provided 18,967 titles and 514 abstracts. Full text analysis of 21 Korean and 50 abroad studies regarding patients with single tooth loss were performed. There were no studies directly comparing the two prostheses. The result of meta-analysis indicated an estimated survival rate of implant prosthesis is 94.5% after 5 year of loading and 91.7% after 10 year of loading. The survival rate of bridge is 84.2% after 5 year of function and 81.3% after 10 year of function. Two studies meeting the inclusion criteria on the subject of quality of life were identified. However it cannot be synthesized.

Comparing the 5 year survival rate for implant prosthesis and bridge, the survival rate of implant prosthesis might be higher than that of bridge in patient with single tooth loss. However, there was no comparative study to determine the relative effectiveness of two prosthesis treatment options.

우리나라 보철치료의 현황 및 단일치아 상실에서의 임플란트 보철 치료와 브릿지의 경제성 평가

□ A systematic review of the survival rates and quality of life of implant-supported fixed prostheses and implant-supported removable prostheses

The purpose of this systematic review was to determine the differences of survival rates and quality of life among implant-supported fixed prostheses, implant-supported removable prostheses and complete dentures for totally edentulous patients.

Electronic searches were conducted in Ovid-Medline, Cochrane and Ovid-EMBASE to identify studies on implant-supported fixed prostheses, implant-supported removable prostheses and complete dentures for totally edentulous patients. Survival rates were calculated for implant-supported fixed prostheses and implant-supported removable prostheses using random effect model to obtain summary estimates.

Electronic search yielded 22 implant-supported fixed prostheses, 53 implant-supported removable prostheses and 21 complete dentures. There were no studies comparing all three types of treatment concurrently. 17 studies compared 2 of the 3 types of treatments for edentulous patients and 5 of which were reporting the survival or failure rates of both fixed and removable implant-supported prostheses. The remaining 12 studies out of 17 comparative studies reported the quality of life. The result of the meta-analysis of the risk ratio of fixed implant-supported prostheses and removable implant-supported prostheses was 0.36. Meta analysis also revealed that the survival rate of fixed implant-supported prostheses was 97.9% and that of removable implant-supported prostheses was 92.5%. When single arm studies were included in meta-analysis, the survival rate of fixed implant-supported prostheses was 98.4% and that of removable implant-supported prostheses was 94.9% after 4-6 years of loading. There was no study about survival rate of complete dentures.

The survival rate of fixed implant-supported prostheses might be higher than that of removable implant-supported prostheses in totally edentulous patients.

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

This study was conducted to assess the cost-effectiveness of dental implant compared with bridge in patients with single tooth loss from societal perspective.

The decision model was used with a 5 and 10 year period respectively. To determine the effectiveness of single-tooth implant and bridge, data were extracted from meta-analysis including single-arm studies. To examine current practical data in Korea, medical costs were categorized to initial treatment costs, maintenance costs and complication treatment costs. Patient survey data were utilized to obtain the initial treatment costs of single-tooth implant and bridge. Maintenance costs and complication treatment cost were based on consulting to clinical professionals. Transportation costs were calculated based on the number of follow-up visits for maintenance of implant or bridge. The one-way fares for dental clinics and dental hospitals reported in the 2008 Korea Health Panel were used as unit costs. The total time spent for the treatment was calculated based on the visit schedules, and time costs were calculated using the hourly wage and employment rate.

The results of a 5 year period model showed dental implants cost 367,000 Korean won (clinic setting) to 485,000 Korean won (hospital) more than 3-unit bridge and also had higher survival rates by 10.3%. The incremental cost-effectiveness ratio was 3,560,000 Korean won (clinic) - 4,711,000 Korean won (hospital) per a preserved prosthesis for 5 years. When the period of economic evaluation on this study is extended to 10 years, single-tooth implant had longer survival rates by 10.4% requiring additional cost of 330,000 Korean won (clinic) or 415,000 (hospital) compared to bridge. The longer period examined, the additional cost of single-tooth implant compared to bridge was decreased.

Although the economic evaluation could not take all aspects of into consideration for single-tooth implant or bridges, this study would be useful as one of the evidences choosing the mode of treatment in patients with single tooth loss.

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□ Conclusion

The patients with tooth loss should choose their dental prosthesis after careful consideration of survival rates, complications, treatment costs and treatment period of dental prostheses. However, the lack of head-to-head clinical studies which compare the effectiveness of each dental prosthesis and insufficient related evidences make it difficult to draw a comprehensive and definite conclusion. This study was conducted with such limitations, but attempts to provide several pieces of information in various aspects by using accessible resources and methods. This study expects to contribute to making a reasonable decision on choosing appropriate dental prostheses.