RETROSPECTIVE MULTICENTER STUDY OF CSM ENDOSSEOUS DENTAL IMPLANT

Eun-Young Park, D.D.S., M.S.D.
Department of Dentistry, College of Medicine, Youngnam University

Statement of problem. To work the economic limitation of dental implant usage, some types of domestic implant have been developing. But, there have been seldom reported about the clinical success rate of them as yet.

Purpose. The aim of this retrospective multicenter study was to evaluate the performance of CSM implants(CSM company, Daegu, Korea).

Material and methods. Thirty-five patients were rehabilitated with 150 CSM implants in this multicenter study.

Results. The success rate was 96.2%. CSM Titanium fixtures can obtain slightly higher success rate when a cover screw was not used for implant installation than when used. However it doesn´t show significant difference(p=.7615, Fisher's Exact test).

Conclusion. This multicenter retrospective study demonstrated the efficacy of the CSM implant in the treatment of variety of clinical manifestation of tooth loss. And it can be assumed that whether a cover screw is used or not should no influence on the osseointegration.

Key Words
CSM implants, Cover screws, Success rate

Although most denture-wearing patients appear to adapt to wearing their prostheses, a significant number do not.[1] The introduction of osseointegrated implant for replacement of missing or lost dentition by Brånemark et al. has revolutionized restorative dentistry.[2,3] After the Toronto Conference, universally began used endosseous implants for the restoration of edentulous patients.[4-6] Initially, the concept of osseointegration was only proposed for the treatment of edentulous patients[2,7] However favorable extended prognosis for osseointegrated titanium implants in edentulous patients[8] has led to expanding application in partial edentulism. Furthermore, in the replacement of missing single teeth, it has become an accepted form of treatment.[9-11]

But, within the country, implants have not been popularized as yet. A fear of the implant surgery should partially account for that, but the greatest reason seems to be a expensive fee due to the high price of implant materials which entirely have depend on an income.

Recently, in order to work this problem, some types of domestic implant have been developing and the interest about them has increased. Neverthless most of dentists are anxious about the use of domestic implants, because there have

been seldom reported about the clinical success rate of them as yet.

It is difficult to evaluate a implant system without th clinical results basis on a long-term study. But, in process of introduction and employment of a new implant system, most failures occur early on. Thus we could predict a subsequent prognosis with a careful observation during the initial phase.

The purpose of this study was to evaluate the performance of CSM implants(CSM company, Daegu, Korea), to contribute to a long-term study of this system, to enhance a reliance of domestic implants and ultimately to offer a superior treatment for a patient. And, it was evaluated if yes or no of cover screws in CSM implant installation had an effect on implant success.

MATERIAL AND METHODS

In present study, we review 30 months(from March, 2001 to December, 2003) of retrospective data of implants accumulated from multicenter.

Thirty-five patients, 11 males and 24 females, 15 to 72 years age(mean age 45 years), participated in this multicenter study.

They were rehabilitated with 150 CSM implants (CSM company, Daegu, Korea), which are titanium-threaded, endosseous implants. In present study were used 4 implant designs of standard(n=18), full-tap(n=26), root form fixture(n=15), and internal fixtures(n=91)(Fig. 1). Cover screws were used in 59 implants(39%) and were not used in 91 implants(61%). Second-stage surgery was performed after an average 4 months(3 months in mandible, 5.5 months in maxilla) from fixture insertion(stage I surgery). The prostheses were delivered after approximately 1 month from second-stage surgery.

The questionnaires(Fig. 2) were given out in 5 dental clinic centers containing dental prosthodontic department, Kyungpook National University Hospital, where CSM implants had been used, and the datas were collected and statistically analysed. Fisher's exact test was used.

The success criteria, proposed by Albrektsson et al.[12] in 1986 and accepted by the American Academy of Periodontology[13] in 1989, were used during this study for the clinical evaluation of the implants.

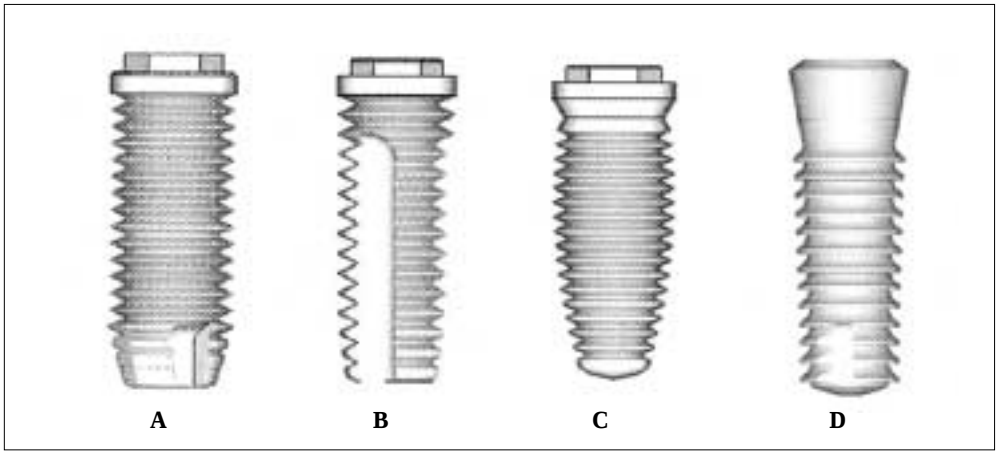

Fig. 1. Illustrations of CSM implant system(CSM company, Daegu, Korea).
A. Standard fixture. B. Full-tap fixture. C. Root form fixture. D. Internal fixture.

QUESTIONNAIRE

Name of clinic : _____ Operater's name : _____

1. Patient's name, gender & age

2. Installation site

3. Fixture width & length

4. Type of prosthesis

5. Patient's satisfaction
   1) Comport : Good ____ Fair ____ Poor
   2) Chewing efficancy : Good ____ Fair ____ Poor
   3) Esthetics : Good ____ Fair ____ Poor
   4) Articulation : Good ____ Fair ____ Poor

6. Success or failure

7. Usage of cover screw
   Yes ____ No ____

8. If failed, its time and presumptive cause

9. Dates of first, second surgery & prosthesis delivery

Fig. 2. The contents of questionnaires.

RESULTS

1. Distribution of patients

The patient populations consist of 11 males and 24 females and varied from 15 to 72 years, 45 mean years, in age(Fig. 3).

2. Installation site

The location of implants are given in Fig. 4.

3. Fixture width and length

Fig. 5 and 6 show diameters and lengths of implants placed. The majority of implants was

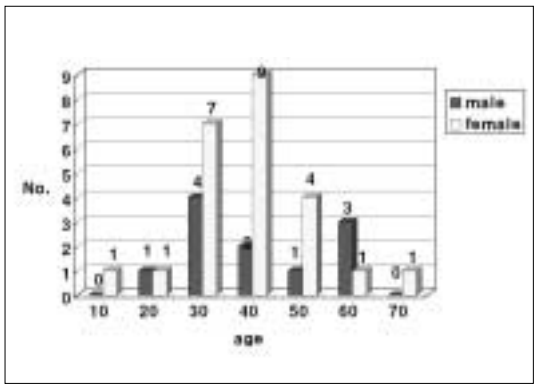

Fig. 3. The distribution of the patient.

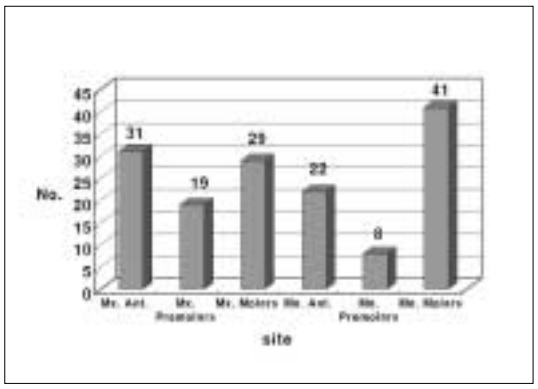

Fig. 4. Installation site.

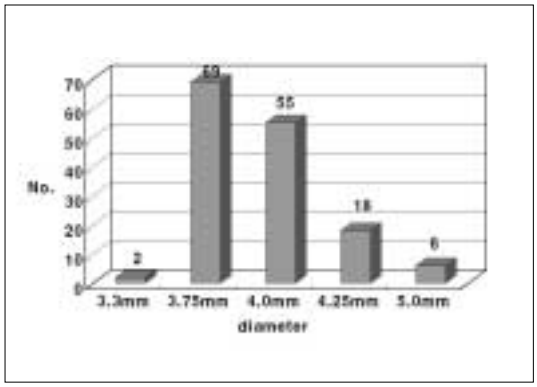

Fig. 5. Fixture width.

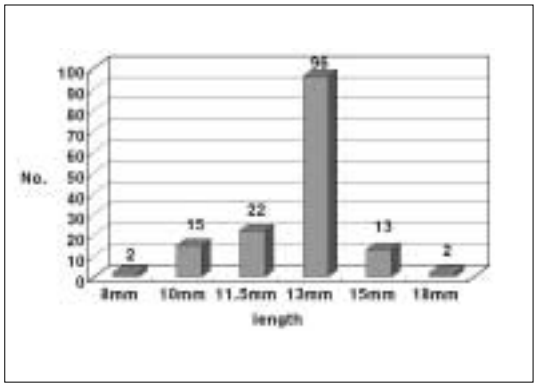

Fig. 6. Fixture length.

3.75mm(46%) and 4.0mm(37%) in diameter and 13mm(64%) in length.

4. Type of prosthesis

Among the osseointegrated implants, 131 suppocted fixed prosthese containing single crowns and 13 supported overdentures(Fig. 7).

5. Patients' subjective post-treatment evaluation

Every patients reported considerable satisfaction with the prosthetic result achieved(Table I).

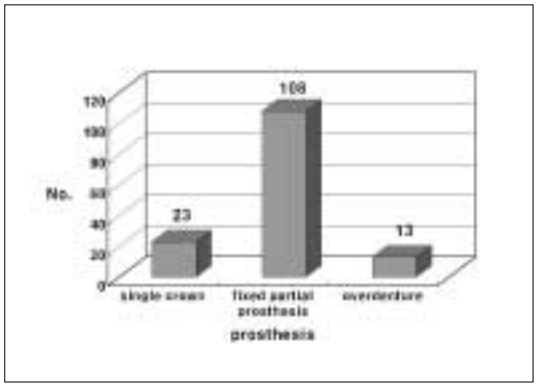

Fig. 7. Type of prosthesis.

Table I. Patients' satisfaction

	Good	Fair	Poor
Comport	35	-	-
Chewing efficacy	35	-	-
Esthetics	24	9	-
Articulation	35	-	-

Table II. Total success rate

	implants placed
Success	144(96.0%)
Failure	6(4.0%)
Total	150

Table III. Patient gender and success rate

Gender	Implant placed	Success implant	Success rate
Female	89	86	96.6%
Male	61	58	95.1%
Total	150	144	96.0%

Table IV. Location of implants and success rate

Locaion	Implant placed	Success implant	Success rate
Mx. ant.	31	30	96.8%
Mx. post.	48	45	93.5%
Mn. ant.	22	22	100%
Mn. post.	49	47	95.9%
Total	150	144	96.0%

Table V. Usage of cover screw and success rate

	Implants placed	Success implants	Success rate
Yes	59(39%)	57	96.6%
No	91(61%)	87	95.6%
Total	150	14	96.0%

Table VI. Causes of failure

	Use of cover screw	
Etiology	Yes	No
Failure of primary fixation	-	1
Peri-implantitis	1	1
Mobility of implant	1	1
Impossibility of prosthesis	-	1

6. Success rate

Among the 150 implants placed, 6 implants failed during the healing period(Table II). However an additional implant has not failed during the follow-up period after prosthetic connection.

The success rate was higher among females (96.6%) than among males(95.1%)(Table III).

The highest rate of success is found in the mandibular anterior area(100%) and the lowest rate of success is in the maxillary posterior area (93.5%)(Table IV).

Cover screws were used in thirty-nine percent and were not used in sixty-one percent. CSM Titanium fixtures can obtain slightly higher success rate when a cover screw was not used for implant installation than when used(Table V). However it doesn´t show significant difference(p=.7615, Fisher' s Exact test).

There were 6 implant failures before the abutment connection. Its causes have been shown on the following Table VI.

DISCUSSION

Dental implants have revolutionized treatment for patients suffering from tooth loss. Although introduced initially for the treatment of fully edentulous patients, this technique has been successfully used for the treatment of partially edentulous situations and single-tooth replacement. Despite broadening of the indications, the same basic surgical principles initially applied to edentulous patients appear to be related to long-term success in all applications. Gentle surgical techniques so that the host bone site is not overinstrumented use of copious irrigation to control the temperature and a non-loaded period to facilitate osseointegration are essential for successful treatment with endosseous implants.

A review of relevant literature reveals similar success rates as found in this retrospective study. Albrektsson et al. reported on the results of a 5- to 8-year multicenter study in Sweden of Nobelpharma pure-titanium threaded implants. The success rate were 84.9% for the maxilla and 99.1% for the mandible.[14] In another study of partially edentulous patients, a 97.2% success rate over an observation period of 5 years was reported using Nobelpharma implants.[15] Similarly, Zarb & Schmitt, using Nobelpharma implants, found a success rate of 94.3% in the posterior partially edentulous patients and 91.5% in anterial partially edentulous patients, respectively.[16,17] Another long-term study on Nobelpharma implants in posterial areas described a 95.5% success rate in the mandible and 95.2% in the maxilla.[11] In 5-year study of IMZ titanium-plasma sprayed cylindrical implants, a success rate of 92.9% in the maxilla and 95.8% in the mandible were reported.[10] In 5-year multicenter study on 3i implants by Lazzara et al. the success rate were 93.8% for the maxilla and 97% for the mandible. And they emphasized that confirmed bone anchorage was considered essential for success, its determination was based on clinical signs of persistent pain, mobility, discomfort, infection and/or inflammation.[18]

Lee et al. reported on the results of retrospective multicenter study in AVANA implant system-Korea. The success rates were 96.2%.[19] In another retrospective study of domestic implants, a 95.3% success rate was reported using Neoplant implant system-Korea.[20]

The results of the present study with success rates of 96.0%, are similar to the above-cited published data. The high degree of success may be attributed to careful patient selection, gentle surgical technique, strict oral hygiene protocol with regular recall appointments, avoidance of excessive cantilevering, especially in posterior areas with suboptimal bone quality and avoidance of con-

nections between implants and natural teeth.

The success rate was higher among women (96.6%) than among men(95.1%). A few greater success rate among women may be explained as follows;

1. Women generally have a more positive attitute with respect to general health care ; they consult medical and dental professionals more readily and more often.
2. Women have the desire to maintain their looks and their youthful appearance.
3. Dental hygiene is more evident among women.
4. Occlusal forces are not as great among women.
5. The women in this study were found to smoke less than the men.[21]

The highest rate of success is found in the mandibular anterior area(100%) and the lowest rate of success is in the maxillary posterior area(93.5%). The quantity and, especially, the quality of bone appear to be determining factors for success of osseointegration.[22]

We compared the probability of implant success between the cases of using cover screws and the cases of not-using cover screws. CSM Titanium fixtures can obtain slightly higher success rate when a cover screw was not used for implant installation than when used. However it dosen´t show significant difference (p=.7615). The results of this study demonstrates that CSM Titanium fixtures can be achieved proper osseointegration as when a cover screw was not used as when used.

It appears that loss of integration was the major cause of implant failure and occurred in early healing period before loading.

Most of patients had no complaints. The lists of complication and failures appeared to be similar to those reported in other studies.[5,6]

CONCLUSION

We analysed the clinical data accumulated from 5 dental clinical centers, where CSM implants had been used, and got the following results.

1. Every patients were satisfied considerably with the prosthetic results.
2. A total success rate of CSM implants was 96.0%. That showed little difference which reported other papers.
3. There were no significant difference(p=.7615) in the success rate between when a cover screw was not used for implant installation and when used.

This multicenter retrospective study demonstrated the efficacy of the CSM implant system, which is one of domestic implants, in the treatment of variety of clinical manifestation of tooth loss. And within the limits of this study, it can be assumed that whether a cover screw is used or not should no influence on the osseointegration.

However, this study was conducted in relatively short-term follow-up patients. Thus further study should have continued for longer period.

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Reprint request to:

EUN YOUNG PARK, D.D.S., M.S.D.
DEPARTMENT OF DENTISTRY, COLLEGE OF MEDICINE,
YOUNGNAM UNIVERSITY
317-1, DAEMYUNG-5-DONG, NAM-GU, DAEGU, 705-717,
THE REPUBLIC OF KOREA
acidic@hanmail.net