Prevention Based Incremental Dental Health Care System with the Applying the Individual Oral Health Index

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In this paper, the theory and practice to develop the individual oral health index for dental patient was introduced, in consideration of the concept for evidence based and simple apply for the clinical use, in order to use it for the prevention based continuous and incremental oral health care system for dental patient. Individual oral health index as a representative level of oral health for each dental patient has been developed with the consideration of the 5 factors which can be influence the oral health in general as, the numbers and the health state of the residual natural teeth, caries state in the oral cavity, periodontal state, the other tissue health state and the oral health care habits or ability and the systemic conditions for individuals. The different weight for each factor was suggested through the regression model by some clinical tests. It would be important that this system as prevention based continuous and incremental dental care by use of computer system will be a motivation to spread the preventive cares in Korea gradually, through the encourage of the preventive cares effectively.

Keywords: prevention, dental health care system, oral health index

Introduction

The representative oral diseases as dental caries and periodontal disease are characterized with such points as pandemic, chronic and accumulative with irreversible diseases, but have a fortunate point as a possible to prevention [1]. So it has been well known that the best way to control these oral diseases would be prevention with continuous cares for dental patients. It has been a principle for control the oral disease that the management with the secondary prevention would be better than with third prevention, and the best, with the primary prevention [2].

Even though dentists know the importance of the prevention, the prevention is not a common item for dental treatments in most of the capitalism countries, but they have been interested in the tertiary cares as prosthodontic cares or dental implant. Moreover, it has been a common sense that the most important thing to change the trend of the dental cares in a country would be the dental fee system in capitalism countries. Because most of dental workforces want to get more incomes rather than the duty or the pleasure from the keeping the principle for oral health cares at present situation. Under this environment, preventive dentistry should develop a new system for promoting the preventive cares through the changing or developing the dental fee system with supplying the incremental and continuous dental cares [3].

There have been several systems for dental fee in the world and extremely different systems would be compared as fee per
item of service and capitation fee system. Fee per item of service has been selected from the capitalism origin countries based on the marketing theory economic countries as United State of America and their influenced countries as Japan, Korea, and some Asian countries as the most of the country choose this system because of simple and convenient for understanding for patients. Under this system, dental income would be more when treat more and severe items as tertiary cares and cause the neglect of the preventive cares. Otherwise in capitation fee system has been developed from the countries emphasizing the social security as European countries as United Kingdom, Sweden, Finland, Germany, France, and some Asian and Oceania countries influence from European countries, as dental care delivery through receiving the yearly dental management fee by contracting between the dentist and the patient. Under this system, preventive care might be emphasized than tertiary cares because of more income for dentist [4].

It might be hard to change one system to other system because it should be connected with the political, economic and social system for the country. So, it needed wisdom to develop the idea for promoting the prevention with the incremental dental health care system through the contract with the dental patient for yearly management fee for prevention, even in the capitalism country.

Oral health index for individual dental patient should be developed for estimating the level of the yearly dental management fee for the preventive cares, to accomplish the successful incremental oral health care system with the capitation style of dental fee, in capitalism country. The oral health index should represent the oral health level for individual objectively through estimating and considering such points for personal oral state as the natural teeth, caries state, periodontal state, the other oral state, systemic body state related with the oral health and the individual oral health care habits and abilities. Moreover, it can be used by trained dental hygienist freely, under the supervision of the dentist [5].

It might be reasonable that the more yearly management fee for the patient with the poor oral health index and the less for the patient with the better oral health index. So it needed the reasonable score system to devise the scoring system with the consideration of the statistical theory and practice as the regression model on each factor for the scoring point [6].

In this paper, the theory and practice to develop the individual oral health index for dental patient was introduced, in consideration of the concept for evidence based and simple apply for the clinical use, in order to use it for the prevention based continuous and incremental oral health care system for dental patient [7].

Method and Discussion

Individual oral health index as a representative level of oral health for each dental patient has been developed with the consideration of the 5 factors which can be influence the oral health in general as, the numbers and the health state of the residual natural teeth, caries state in the oral cavity, periodontal state, the other tissue health state and the oral health care habits or ability and the systemic conditions for individuals. It can be showed the level of the oral health state by drawing the diagram as R-program shown in Figure 1.

**Figure 1.** R-Program for estimating the individual oral health index.
But, it is not easy to determine how much influence each factor for one’s oral health, and the regression analysis through the statistical method was applied to know different weight for each factors and sub-factors through the clinical researches. Six scales of the age distribution was applied as preschool child, child, adolescent, young adult, prime of manhood and aged group, in order to develop the a little different weight for each factor or sub-factor according to the age group [8].

At first, the residual natural teeth index was estimated by the consideration of the number of the natural teeth, as well as the tooth functional state, such as the indication tooth for extraction or implanted tooth. The individual score for the natural teeth was decided with the comparison of the average data for the numbers of the residual teeth examined by Korean National Dental Survey. The relative score was described if you examine and count the patient’s teeth, with the consideration of the tooth state, in gross.

Caries state program was consisted with the caries existence or experienced score as the numbers of the tooth, decayed, filled, or extracted because of dental caries, and the caries prediction score checked by a caries activity test, together. Of cause, it was estimated more full score according to the weight distribution by regression analysis, it revealed much more in full score in the child and adolescent age group than in adult or aged group, otherwise more in full score, for the periodontal factors for them. Caries factor was included of such sub-factors as caries existence, filled or extracted state, as well as, the caries prediction score for individual [9].

The periodontal state was calculated by consideration of such sub-factors as dental plaque index, calculus deposit state, oral micro-organisms, gum state, alveolar bone level examined by use of Panorama dental radiograph, according to the different weight points by each factor and sub-factors by age group [10].

The other oral state points was estimated in consideration of such sub-factors as the malocclusion, temporomandibular joint trouble, oral infection, oral malodor, and fractured tooth or hypersensitive tooth.

The oral hygiene care or oral health care ability was estimated with such factors or sub-factors as patient hygiene performance index for plaque deposition, tooth-brushing habits and frequency, sweet dietary problems, preventive dental cares and smoking or drinking habits. It was also considered such systemic conditions as hypertension, diabetes, and some systemic diseases, or oral malformations.

All factors and sub-factors were influenced to estimate the oral health score for individual, with regarding of the different weight points for each factor, according to the age group. The different weight point for each factors and sub-factors by age group was shown in Figure 2.

And then, we developed the computer program for easy calculation of one’s oral health index, by use of Excel program. Oral photo taking with DSRL camera or cellular phone camera was done for every dental patient who join the continuous and incremental oral health care program, in order to easy oral exam

<table>
<thead>
<tr>
<th>Preschool</th>
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<th>Adolescents</th>
<th>Young adult</th>
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<td>Snyder test</td>
<td>3</td>
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<td>2.9-3.8</td>
<td>Salivary pH x Snyder</td>
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<td>Bacillus activity</td>
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**Figure 2.** The different weight points for each factor according to the distribution of the age. Min-Max: minimum-maximum, S-PHP: simplified patient hygiene performance index, T.B.: tooth-brushing, R.RD: removable partial denture.
and more accurate diagnosis for oral state, later, shown in Figure 3 [11].

On the first page of the program, personal information as name, gender, birth date, address, phone number, and taking the patient’s facial photo to insert the page, in order to get one as one of the family in this dental clinic for continuous and incremental dental cares through receiving the periodical checking through estimating the individual oral health index, by computer program. The aims of the continuous and incremental oral health care is, dare to say, to increase this index, year by year, as the evidence for the promoting the oral health state for individual.

The half of the under the page, it will be shown some questions about patient’s oral health care habits, and it will be different questionnaire according to the age group, and after you answer it, the score for one’s oral health will be calculated automatically, one by one, as shown in Figure 4.

The second page shows the recording of the oral state through the showing or magnified image from the oral photo. Tooth filled state, prosthodontic appliance or orthodontic appliance and dental sealant were checked and recorded from the magnifying dental image one by one, and then the score will be calculated automatically. It will be relatively easy to record it because the trained dental hygienist may just do click on the proper example for the patient’s oral state. For examples, in case of dental officer click the filling on the lower first molar tooth, just do click on filling blank and it will be shown such items as the filling materials and filling surface. So, the dental officer can do just click on the proper blank, and then, the oral health score will be estimating one by one, shown in Figure 5.

The third page will be shown for the checking the periodontal tissue by observing the panorama radiograph, which was al-
ready transferred to the 3rd page of the computer program. In this page, alveolar bone level will be checked, not in detailed but with gross check, as point 0 to 4 scale. The caries activity test and the oral micro-organism check will be done in this page with briefly check through the clinical standardizations, by use of Snyder test kit and phase-contrast microscope, as shown in Figure 6 [9,12].

Dental plaque check painting with the disclosing agent on the tooth surfaces and taking oral photos for 5 or 6 cuts and then put them on the 5th page, in order to estimate the plaque check, shown in Figure 7. Plaque index will be checked with relatively simple decision as no, rare, moderate, lots, and severe.

The total score for individual oral health will be shown in page 5 with the decision of excellent, good, moderate, difficult, and poor of the oral state with the exact score together. It will be shown in Figure 8. Sometimes it will be judged as A to E level of the oral health, compared with others of the similar age group.

The next page of the computer program, you can find the proper schedules for visiting dental clinics with the different frequencies for yearly dental visiting according to the individual oral health index. It will be shown the date for visiting schedules on the individual dental calendar, as shown in Figure 9.

The different type of the computer program was developed according to the age group in consideration of the importance rate of each factors and sub-factors by age group [13-16].

**Conclusion**

The prevention based oral health care system by use of the computer program with the individual oral health index was very effective to applying in dental clinic to manage the dental patients continuously and incrementally.

This system has been distributed to some of dental hospitals and clinics for effective management for dental patients as an appropriate recall system, and a little bit modification of the system was permitted for proper use at each dental clinic, as changing the system from oral health index to estimation of the dental age for individual, or changing the title of the system from prevention based dental care system to dental SPA system, according to the purpose of final goals for each dental clinic.

Lots of the dental clinics in Korea have interested in this program in order to promote their patient’s oral health really and to prove the evidence for improvement of oral health level by continuous cares. It would be important that this system as prevention based continuous and incremental dental care by use of computer system will be a motivation to spread the preventive cares in Korea gradually, through the encourage of the preventive cares effectively.

**References**