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Clinical Efficacy of Mixing Natural Teeth and Implant Supported Denture Sleeve

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ABSTRACT

Objective: To analyze the clinical efficacy of Mixing natural teeth and implant supported denture sleeve, and provide reference for clinical treatment. **Methods:** 46 patients with Molarless in hospital from December 2010 - December 2014 were selected, patients were randomly divided into observer group and control group, two groups of patients were designed and planted natural teeth fixed bridge and natural teeth and implants mixed support sleeve denture, regular follow patients and the surrounding alveolar bone height changes, 5-year cumulative retention rate, clinical efficiency and other indicators. **Results:** During clinical observation, patients with no obvious symptoms, the use of feel good, no loose superstructure situation. Two groups of patients were 2 cases of patients with implant loosening occurs, the amount of bone resorption annual observation group (0.22 ± 0.10) mm less than the control group (0.24 ± 0.08) mm, but no significant difference ($P > 0.05$), clinical observation group efficiency (100%) was significantly higher (72.3%) ($P < 0.05$), the observation group study implants 5-year cumulative retention rate was 94.4%. **Conclusion:** Mixing natural teeth and implant - supported telescopic denture success rate of 100% was observed during the clinical results were satisfactory, with use value.

1. Introduction

At present, the research on the restoration of the natural tooth-implant combined support is controversial, and the focus of the controversy is that the biomechanical properties of the two are different. The three-dimensional finite element test shows that it is feasible to use a reasonable design for the joint support scheme as long as the resultant force can be evenly distributed on the abutment^[1], however, such dentures often have excessive loosening, absorption of the alveolar bone of the

implant, and the like. The sleeve crown retainer consists of an inner crown and an outer crown. The force of the abutment between the inner and outer crowns is used to cushion the abutment, and the denture is well retained and stabilized, such telescopic dentures are often used for fixed-to-active joint repair of most missing teeth and a few residual teeth, which can protect the remaining teeth and the surrounding supporting tissues, which can also reduce the stress on the restoration and help to maintain the health of the abutment and its surrounding tissues in isolated orthodontic patients. In this study, the cushioned

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telescopic crown was used as the upper structural retainer of the implant in the natural dental-implant-supported restoration. The aim is to explore whether the clinical efficacy of placing the telescopic crown on the implant is superior to that of the natural dental-implant combined support prosthesis and can be widely used in oral clinical practice. The patients who have undergone dentition defect in our hospital are the subjects of the study. The report is as follows:

2. Data and Methods

2.1 Case Selection

46 patients with dentition defects of the mandibular molars who were admitted to our hospital from January 2010 to December 2014 were selected as subjects. Patients with good general condition, no systemic disease, implant surgery, good compliance, and missing molars were required to be divided into observation group and control group, respectively. There were 15 males and 8 females in the observation group, aged 58-76 years, with an average of (70.3±5.6) years old; there were 14 males and 9 females in the control group, aged 60-78 years, with an average of (71.6±6.0) years old. The general data of the two groups were comparable ($P>0.05$).

Table 1. Case selection

Group	Observation Group	Control Group	P
Gender (male/female)	15/8	14/9	0.7600
Age	70.3±5.6	71.6±6.0	0.0603

2.2 Experimental Materials

There were 36 implants in the observation group and 38 implants in the control group. The materials and instruments used in the observation group mainly include: straumann implant (4mm in diameter, 10mm in length), abutment, cobalt-chromium alloy, zirconia, pure titanium inner crown, cobalt-chromium alloy, gold deposit, pure titanium sleeve crown, cobalt-chromium alloy, pure titanium bracket, metal baked crown, dental CT, digital imaging machine, etc. The control group was fixed with conventional fixed bridge. The main instruments included straumann implant (4mm in diameter, 10mm in length), abutment, cobalt-chromium alloy, pure titanium porcelain crown, zirconia crown, dental CT, digital imaging machine, etc.

2.3 Experimental Methods

The patients in the observation group and the control

group were routinely prepared for natural teeth, and the implants in the edentulous region were routinely implanted, and the second premolar and the second molar implant were used as the abutment. In the observation group, the implant was implanted in the edentulous area, and the implant was healed without force for more than 3 months. After the healing was confirmed to be good, the upper structure was repaired, and the sleeve crown was fixed in the implant segment. The traditional tooth preparation for the natural tooth is completed, and the natural tooth and implant mixed support sleeve crown is repaired, and the patient is regularly reviewed after 3, 6 and 12 months. Healed for more than 3 months without stress, after healing, repair the upper structure and check regularly at 3, 6, and 12 months. The two groups of patients were examined for implants before repair, requiring no inflammation, looseness, healthy surrounding soft tissue, good bone healing on X-ray examination, good bone binding standard, silicone rubber modulo, fixed bridge and sleeve crown, try on, bonding.

2.4 Observation Index

Evaluate the patient's self-conscious symptoms, determine the natural tooth and implant looseness, X-ray examination after implant denture repair, determine the actual bone resorption (Measure the distance of bone resorption with ODIS image analysis software and eliminate the magnification of X-ray film by mathematical calculation).

2.5 Clinical Efficacy Evaluation

The clinical efficacy evaluation is divided into three grades. The natural abutment has no gingival hemorrhage, periodontal pocket, and X-ray without alveolar bone resorption. The patient's subjective feeling is good and does not affect chewing. The natural gums have no redness and no periodontal pockets. The X-ray shows that the implant's gingival bone absorption is less than 2mm. It is effective that the patient's subjective feeling is good but can't chew hard food, and it is ineffective to loosen the implant or absorb the natural alveolar bone more than 2mm, clinical efficiency = marked effective rate + effective rate.

2.6 Statistical Analysis

Using SPSS19.0 statistical software, the bone resorption amount accorded with the normal distribution using t test, the clinical evaluation and the cumulative retention rate were tested by χ^2 test, and the difference between groups was significantly indicated by $P<0.05$.

3. Results

3.1 Patient Satisfaction Survey and Clinical Examination

Through the form of questionnaire survey, the patients were included in the clinical observation period, including chewing efficacy, comfort and aesthetics. The results were divided into dissatisfaction, general satisfaction and satisfaction. Perform a systematic clinical examination of the patient, including the alveolar ridge and mucosa of the dentition-deficient area, whether the implant is loose and the absorption of the surrounding alveolar bone, the periodontal and periodontal tissue of the natural abutment, the retention and stability of the denture.

3.2 Annual Average Bone Resorption of Implants

There were 2 cases of implant loosening in the two groups. The other cases showed no obvious bone resorption and good function. The average annual bone resorption of the observation group was smaller than that of the control group, but the difference was not obvious ($P>0.05$). See Table 2 for details.

Table 2. Comparison implant bone loss annually

Group	Implants	Bone Resorption(mm)
Observation Group	36	0.22±0.10
Control Group	38	0.24±0.08
P		0.4579

3.3 Comparison of Clinical Evaluation

All patients were successfully followed up for more than 5 years. The clinical effective rate of the observation group was significantly higher than that of the control group ($P<0.05$). See Table 3 for details.

Table 3. Clinical Efficacy Evaluation

Group	Excellent	Effective	Ineffective	Total efficiency (%)
Observation Group (n=36)	29(80.6)	7(19.4)	0	100
Control Group (n=38)	18(47.4)	11(28.9)	9(23.7)	72.3
P				0.0018

4. Discussion

There are many methods for planting and repairing. In the clinical, especially after the treatment of missing teeth, sometimes the use of natural tooth and implant combined support denture repair program is considered. For exam-

ple, under certain clinical research conditions, such as patients with insufficient bone loss in the posterior teeth or due to the economic factors of the patient, or implants with short implants, the prognosis is not good; therefore, it is of great practical significance to study the fixed restoration method of natural tooth-tooth implant support^[2,3].

The combination of natural teeth and implants can avoid areas with poor planting conditions and alleviate patient suffering. It is a relatively simple method of planting and repairing clinical operations. Many scholars believe that the joint support of fixed repair can make full use of the feedback regulation of natural periodontal ligament^[4], to reduce trauma. Initial research suggests that the support of natural teeth and implants will affect the soft and hard tissues of natural abutments, and it is prone to the loss or breakage of the prosthesis. In recent years, it has been found that combined with the joint-supported fixed repair, the natural tooth can play a proprioceptor role, improve the sensibility, and at the same time, can also use the periodontal reserve capacity of the natural tooth to avoid the bite force and lead to the wound.

There are some differences in the mechanical properties of implants and alveolar bones in the design of joint support and restoration of implants, including rigid joints and non-rigid joints. In theory, it is considered that the use of a non-hard connection method can reduce the difference in physiological mobility between the two. Some scholars have designed the IMZ planting system to make the implants have physiological kinetics similar to those of natural teeth, meeting the requirements of uniform stress distribution. Domestic scholar Yina Lin^[5] and other researches have pointed out that there is no significant difference in bone resorption between different combinations, and there is no significant difference in stress size and distribution. More and more studies have pointed out that the rigid connection between implants and natural teeth is a more feasible method of repair^[6], in this group of studies, the natural tooth and implant mixed support socket denture rigid connection was used, and the connection was rigidly connected. The sleeve crown is composed of an outer crown and an inner crown, and the gap between them can buffer the stress on the abutment. In this study, the design of the sleeve retainer in the anterior segment of the implant, buffering the stress level of the implant, can improve the different support bone histological responses between the two, and reduce the possible damage of the supporting tissue^[7]. At present, there are many researches on the joint restoration of natural teeth and implants in China. Most of them focus on the analysis of finite element models, and analyze the stress distribution of supporting tissues and teeth. Guangping Xie^[8] and other studies have analyzed the stress analysis of nat-

ural tooth and implant combined support sleeve crown, and found that there is no significant difference in stress values between vertical distribution and lateral distribution, and the effect of natural dental bone tissue is not obvious. The opposite is true for cushioned sleeve crowns, the soft tissue covered by the alveolar ridge can share the partial load to reduce the burden on the implant, suggesting that measures such as expanding the base area and reducing the length of the free end should be taken during the clinical design to prevent the alveolar ridge from being overstressed. During the clinical observation period, the patients had no obvious discomfort, and felt good when used, and the upper structure was not loose. Two groups of patients had implant loosening in 2 cases. The annual average bone resorption capacity of the observation group (0.22 ± 0.10) mm was smaller than that of the control group (0.24 ± 0.08) mm, but the difference was not obvious ($P>0.05$); the clinical effective rate (100%) of the observation group was significantly higher than that of the control group (72.3%) ($P<0.05$). The cumulative retention rate of the implants in the observation group reached 94.4%. It can be seen that in a short period of time, the success rate of the support of the natural tooth and implant mixed support denture is 100%, which is feasible in the short term. For the long-term efficacy, it is necessary to extend the follow-up time for further observation. Natural tooth and implant mixed support telescopic denture need to pay attention to the coordination of bite force conduction, reduce the lateral stress on the implant; the bite force needs to be restored within the physiological range, reduce the span of the bridge, and reduce the buccal diameter of the restoration, the stress on the upper restoration should not exceed the baseline, and the implant should be of sufficient length to be reviewed periodically after repair. When the implants are in different orientations, adjust the position in time to avoid improper stress. The implant surface should be highly polished to avoid plaque adhesion. Natural teeth are preferably healthy teeth. Patients should be reviewed at least once every six months to remove plaque and maintain the health of soft and hard tissues.

5. Conclusion

At present, there is still much controversy about the

support of fixed bridges supported by natural teeth and implants. In this study, it can be seen that the success rate of natural tooth and implant mixed support telescopic dentures is 100%, the effect is obvious, and it has useful value.

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