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The clinical study of locator implant overdenture used in effects of restoration on elder mandible with edentulous jaw

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ABSTRACT

Objective: on the basis of the X-ray, the clinical soft tissue inspection and the conditions of complication after restoration, to evaluate the locator implant overdenture used in long-term clinical effects of restoration on elder mandible with edentulous jaw. **Method**: a total of 13 patients who were mandible with edentulous jaw (age between was 61-77, average age was 66.8) were inserted 2 pcs straumann implants separately (totally 26 pcs implants), proceeded the locator attachment restoration, and return visited after restoration. Follow-up observation, filmed X-ray and inspected oral regularly to observe the bone resorption of peri-implant and the conditions of soft tissue, and then analyzed complications. **Results**: during observation, no implant was failed, 26 implants had no obvious resorption of the marginal bone, 2 implants had peri-implant mucositis, 2 retentive force of dentures were decreased which were increased after changed the locator retentive inner liner. **Conclusions**: the clinical effects of locator implant overdenture is reliable, and it can improve the life quality of the elder patients who have edentulous jaw.

KEYWORDS

Edentulous jaw; Straumann implant; Implant overdenture; Locator.

INTRODUCTION

Mandible with edentulous jaw is the common disease among elder, due to the resorption of edentulous ridge, the traditional lower denture restoration must result in loose denture, recurrent pain, ulcer and masticatory inefficiency etc problems, and implant denture can solve those problems efficiently. Due to the systemic disease, poor conditions of mandible bone, economic capability etc reasons, some of the elder patients cannot achieve implant fixed denture restoration, so implant overdenture restoration appear its great advantage undoubtedly. This study was followed-up observation to the 13 edentulous mandible elder patients who supported the locator implant denture restoration, to evaluate clinical effects, survival rate and the conditions of complication after restoration, it is reported as follows:

MATERIAL AND METHOD

Case selection

Totally 13 edentulous mandible elder patients who visited our outpatient during October 2009 to January 2013 were inserted 2 straumann implants separately (totally 26 implants) and restored locator implant overdenture. 7 of those 13 patients were male, 6 were female, and age were 61-73 (average age was 66.8). Inclusion criteria:① The elder patient who is mandible with edentulous jaw must over 60 years old. ② No uncontrollability of systemic disease. ③ The conditions of oral hygiene is well controlled. Exclusion criteria: ① Alcoholism② The periodontitis is not controlled on remain teeth from the jaw. ③ Suffer local radiotherapy or systemic chemotherapy within half year. ④ Exist serious systemic disease that can not tolerate implant operation. ⑤ The oral hygiene is poor. ⑥ The patient can not cooperate treatment because of mental factor.

Material

Straumann implant and its matched locator abutment

Implant operation and restoration

On the basis of oral inspection, combined with the result of imageology measurement, confirmed the implant type, and inserted the straumann implant separately on the canine teeth area of the edentulous mandible. Adjusted the original complete denture on the mandible as the interim denture. After three months implant, restored the locator implant overdenture on mandible, and chosen the proper treatment solution on the basis of patient different conditions of anodontia on maxillary. This group of case were all adopt straumann implant, 20 pcs were SLA surface soft tissue horizontal implant, and 6 pcs were SLActive surface soft tissue horizontal implant. Transgingival height was 1.8mm, 18 pcs implants were 4.1*12mm, and 8 pcs implants were 4.1*10mm. There was no bone transplantation in the implant operation, and proceeded the healthy guidance of oral hygiene after operation and restoration.

Clinical follow-up visit

All patients did return visit and filmed X-ray on follow-up visit every year after pre-operation, post-operation, pre-restoration and post-restoration of implant. Inspection items were include in soft and hard tissue conditions of peri-implant, the conditions of restoration, and with or without biological or mechanical complications etc.

CONCLUSION

All implants were not loosed or failed during the observation, and all kept stable synosteosis. There was no found obvious resorption of the marginal bone by X-ray inspection. 2 implants had peri-implant mucositis within 1 case, as the main reasons were poor glycemic control and poor oral hygiene in short term by patient himself, and the inflammation was well controlled after controlled the blood glucose efficaciously by internal medicine system and well cared the peri-implant. In this group of case,

2 retentive force of dentures were decreased which were increased after changed the locator retentive inner liner. Discussion

Along with the development and improvement of the oral medical technology level, mere old-aging is already not the contraindication of implant, but the elder aging changes of oral tissues and organs, general conditions, and elder psychology etc particularity, to enlarged the risk of implant restoration. Both of the hypertension and diabetes mellitus are the common and frequently-occurring disease for the elder. Among the hypertensive patients, the grade Ⅰ hypertension (systolic blood pressure is 140 ～ 159 mmHg, and diastolic blood pressure is 90 ～ 99 mmHg) can be operated directly, however, for the patient who is mental stress need to give tranquilizing drug before the operation, in order to avoid blood pressure to be risen, and result in systemic complications. The level over grade Ⅱ (systolic blood pressure is ≥160 mmHg, and diastolic blood pressure is ≥100mmHg) must control the blood pressure under grade Ⅰ to do the operation. Diabetes mellitus patient must control and stabilize the blood glucose level under 150 mg／mL before implant operation, and it must care about the anti-inflammation before and after operation to prevent infection and poor wound healing etc complications. Osteoporosis will affects the bone healing period of peri-implant, and it is the frequently-occurring disease for the elder especially the postmenopausal female, but in long-term observation, it will not affects the implant combine with bone. During the operation, in addition to adopt the method of bone extrusion and implant bone to improve the bone mineral density of peri-implant, increase the primary stability of implant, promote the osseointegration of implant, chemically-modified hydrophilic SLA, modSLA (SLActive) implant also can be adopted. Base on the original implant of sand blasting and acid etching, SLActive implant proceed the chemical modification to strengthen its surface hydrophilia, thereby strengthen the activity of the MC3T3-E1 osteoblasts[1,2], and shorten the bone healing period of peri-implant. It can be the first choice of implant for the patient with osteoporosis.

Implant simplistic design has become a modern implant trend, for the elder who is poor on endurance should try to reduce operation wound, simplify the treatment design, and use the minimum supporting implant to achieve the best effect of implant overdenture. With regard to the problem of implant quantity in the implant overdenture, as early as the year 2002, in the consensus statement of the McGill University presented that the implant overdenture which is supported by 2 pcs implant of mandible can gain the same success rate with the implant overdentue which is supported by more implants[3]. The academic A.M.El-Sheikh etc separated 20 edentulous mandible patients randomly into two groups, separated insert 2 and 3 pcs implants which were 3.3mm in diameter, and proceeded the restoration of locator attachment. Return visited separately after 6, 12 and 24 months of restoration to inspect implant success rate, dental plaque index, calculus index, bleeding index, probing depth and bone resorption extent. After comprehensive comparison, it was found that there were no obvious difference between two groups on clinical inspection and imageological inspection ($P>0.05$), therefore, it believed that it is no necessary to insert over 2 pcs implants[4]. Moreover, M. H. M. De Jong etc did the patient's follow-up visit for 10 years on 2 and 4 pcs implants support overdenture restoration, it obtained the result that there were no obvious difference between 2 and 4 implants on patient's clinical and imageological inspection result. Furthermore, there are big variety of restoration method on implant support overdenture, the common methods are mechanical attachment (ball attachment, bar-clip attachment, stud attachment) and magnetic attachment etc. As the implant support overdenture restoration of the upper part, the locator attachment applied in this study is the new popularity of implant overdenture in the recent years. The locator abutment possess both effects of self position and dual retention, retentive force can be adjustable and it has good effects on retention. Positive gasket can adjust top to 40°angular deviation among implants, and its multiple abutment height can make the locator attachment lower requirements for the interocclusal space, wild range of applications and high success rate of restoration[6,7]. In this study, 26 pcs implant had no obvious bone resorption and serious complications within 2 years observation, compared with common removable denture restoration, it obvious improved on the masticatory efficiency and the max bite force, and improved satisfaction rate

from patients. It is the ideal method on implant restoration of edentulous jaw, thus locator implant overdenture is worth on wild clinical applications.

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