# Prosthodontic Procedures for an Implant-Supported Maxillary Full-Arch Fixed Prosthesis Opposing Mandibular Implant-Supported Fixed Prostheses

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The maxillary full-arch implant-supported fixed prosthesis represents a challenge due to the structural limitations of the existing premaxillary ridge and maxillary sinus. Prior to initiating implant treatment, it is critical to consider the necessary clinical and laboratory procedures needed to obtain an optimal level of patient and clinician satisfaction. Consideration must be given to establish a comfortable, cleansible prosthesis with a stable, harmonious occlusion that also meets esthetic and phonetic requirements. A 56-year-old female presented at the Graduate Prosthodontic Clinic at the University of Alabama at Birmingham to extract 4 mandibular incisors and the left mandibular first molar, due to advanced periodontitis. Steri-Oss root form implants (3.8-mm and 5.0-mm diameter) were subsequently placed (8 maxillary and 3 mandibular). To evaluate esthetics, vertical dimension of occlusion, and anterior guidance, screw-retained fixed provisional restorations were fabricated for both arches by means of a pick-up impression technique. Cement-retained definitive restorations were constructed and cemented using an acrylic/urethane-based provisional cement (ImProv). Occlusal contacts associated with protrusive and lateral movements were adjusted and oral hygiene instruction was reinforced subsequent to insertion of the prostheses. *(Chang Gung Med J 2006;29(4 Suppl):76-84)*

**Key words: implant, premaxillary ridge, maxillary-sinus anatomy, screw-retained, vertical dimension of occlusion, cement-retained.**

In 1997, Branemark reported on a dental implant system (Nobel Biocare, Sweden), providing a predictable surgical protocol for placing cylindrical, endosteal implants.[1,2] The use of these implants in the rigid fixation of dental prostheses concurrently with the development of further surgical and restorative techniques has benefited many partially and fully edentulous patients.[3,4] For partially edentulous patients, implantation is a technique used to replace missing teeth that avoids the reduction of tooth structure associated with the fabrication of conventional prostheses.[2] Moreover, these patients can be provided with a restorative option that avoids the possible esthetic compromise and discomfort associated with conventional removable partial dentures.[3] For fully edentulous patients, implant-supported or implant-retained overdentures should improve the support and stability of the prosthesis as compared to conventional removable prostheses, with the net benefit of enhanced comfort and increased masticatory function.[3,4] Because of the success of implant treatment, patient-specific implant therapy options should be

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routinely presented to the patient during the treatment-planning phase. Options to be considered by the dentist include the retentive mechanism employed (screw-retained or cement-retained)[1] and choice of impression technique (closed-tray or the open-tray "pick-up" impression technique).[5] Provisional fixed restorations (cement- or screw-retained) should be carefully designed and fabricated for progressive occlusal loading, esthetic evaluation, soft-tissue modification, and patient education prior to finalizing the definitive prosthesis for the patient.[5] The importance of the above issues needs to be clearly emphasized to the patient during the time between the first and last prosthodontic procedures. Due to the relative variability of the premaxillary ridge morphology and maxillary sinus anatomy, surgical considerations become more complex when contemplating the use of an implant-supported maxillary full-arch fixed prosthesis.[6] Prosthodontic procedures such as reconstruction of the vertical dimension of occlusion, esthetic evaluation of intraoral and extraoral states, and establishing anterior guidance must all be seriously and carefully considered in planning for an implant prosthesis. The purpose of this case report was to discuss the critical prosthodontic issues associated with such a restoration and related clinical and laboratory procedures.

## CASE REPORT

A 56-year-old female presented at the Graduate Prosthodontic Clinic of the University of Alabama at Birmingham with a chief complaint of "looseness of my lower teeth". The patient reported no history of systemic disease or medically compromised condition. Clinical examination revealed that the patient was edentulous in the maxillary arch. Periodontal examination revealed that 4 mandibular incisors and the left mandibular first molar had advanced periodontitis associated with severe alveolar bone loss (over 50%). After consultation with a periodontist, it was deemed necessary to extract these teeth (Fig. 1A). The vertical dimension of occlusion was estimated with extraoral measurements determined prior to extraction as well as from the pronasale-pogonion distance as determined by cephalometric radiograph analysis of the patient's centric relation position (75 mm). After presentation of all treatment options, the patient selected fixed restorations for the final prosthetic design. A maxillary interim complete denture and a mandibular removable partial denture were fabricated as transitional prostheses for reasons of esthetics and function during the interim phase of treatment. Full-mouth periodontal treatment including scaling and subgingival curettage was performed in the Department of Periodontics at the University of Alabama at Birmingham. Two months subsequent to extraction of the mandibular teeth, panoramic and computer-assisted tomographic radiographs were made for evaluation of the implantation site. The panoramic radiograph was used to estimate anterior and posterior available ridge height of maxilla (respectively, about 10-12 mm and 1-2 mm) and mandible (respectively, about 12-14 mm and 10-12 mm), the location of the mandibular canals and mental foramina, trabecular bone patterns, and cortical bone thickness. Computer-assisted tomography was used to study the three-dimensional aspects of jaw architecture and bone density. Prior to maxillary implant placement, bilateral maxillary sinus-lift procedures were deemed necessary due to limited available posterior ridge height (1-2 mm). The relatively simple surgical requirements noted for the mandibular arch allowed the periodontist to place the implants without other preparatory surgery. Three Steri-Oss (Nobel Biocare, Yorba Linda, CA, USA) root form implants 3.8-mm in diameter and 12-mm long were placed in areas of the left mandibular central incisor, first molar, and the right mandibular lateral incisor. During the following 9 months, bilateral maxillary sinus lifts were performed with DFDBA (Pacific Tissue Bank, Los Angeles, CA, USA), auto-


**Fig. 1A** Panoramic radiograph of pre-treatment maxillary and mandibular arches.

genous bone graft, and the insertion of a non-resorbable membrane (PeriAid, Collagen Matrix Inc., NJ, USA). Afterwards, six Steri-Oss externally-hexed threaded titanium implants 3.8-mm diameter and 12-mm long were inserted by the periodontist at the site of the right and left maxillary first premolar, the second premolar, and the first molar regions. One Steri-Oss externally-hexed threaded titanium implant 3.8-mm in diameter and 10-mm long was placed in the left maxillary second molar region. One Steri-Oss externally-hexed threaded titanium implant 5.0-mm in diameter and 10-mm long was located in the right maxillary second molar region. A surgical stent duplicated from the maxillary interim denture was used at implant placement surgery to ensure parallelism between implants. After a further healing period of 6 months, all 11 implants (8 maxillary and 3 mandibular) were surgically exposed (Fig. 1B). Implant-supported screw-retained provisional fixed prostheses were designed and fabricated to restore the vertical dimension of occlusion, provide an esthetic preview for the definitive prostheses, and to establish anterior guidance. A pick-up impression technique (open-tray impression technique) was used to transfer the orientation of the implant hex from the patient's mouth to the definitive maxillary and mandibular casts to fabricate provisional restorations. To prevent movement of the impression posts when the impression tray was removed from the patient's mouth, Duralay (Dental Mfg. Co., Worth, IL, USA) resin material was used to connect the pick-up impression posts. To reproduce soft tissue contours, the definitive casts were partially filled with Gingifast silicone material (Elastic gingival mask vinyl siloxane material, Zhermack, Italy), followed by dental stone (Whip Mix Corporation, Louisville, KY, USA). Eight healing abutments adjusted to fit the soft-tissue cuff height of each implant were inserted into the implant analogs in the maxillary definitive cast. A maxillary base plate was fabricated using a Triad light-curing custom-tray material (Dentsply, York, PA, USA). To increase the stability of the record base during jaw relation procedures, polyvinyl siloxane (PVS) light body impression material (Express, GC Corporation, Tokyo, Japan) was used to reline the tissue surface of the base plate. A similar technique had been discussed previously by Rungcharassaeng and Kan,[7] although these authors used Triad light-curing material only, instead of using a PVS relining material to adapt the base plate to the healing abutments. It is possible that the base plate could fracture when constructed of only a light-curing resin material, due to the shrinkage of the resin material into undercuts around the healing abutments. However, the mechanically stable and flexible PVS material can conform to the healing abutments and increase the retention of the base plate without the risk of breakage. The patient's vertical dimension of occlusion was determined by measuring the distance from the pronasale to the pogonion extraorally at the mandibular centric relation position (76 mm). This measurement compared favourably with the patient's existing pre-treatment records as a reference source (75 mm). A 3-mm freeway space was estimated between the rest dimension and the vertical dimension of occlusion. The maxillary base plate and wax rim was adjusted and the interocclusal registration was made with Futar D PVS material (Kettenbach Dental Co., Eschenburg, Germany) at the determined vertical dimension of occlusion. After the interocclusal registration was made, a face-bow transfer was performed, and the maxillary and mandibular definitive casts were mounted on a semi-adjustable articulator (Whip Mix Corporation, Louisville, KY, USA). Eleven Steri-Oss temporary abutments were inserted and prepared for each analog on the definitive casts. Inlay wax (Maves Co., Cleveland, OH, USA) was used to form the provisional restorations, which were then processed using heat-polymerized acrylic resin (Meliodent; Heraeus Kulzer Inc, South Bend, Ind.). Pink acrylic repair resin (Hygenic Repair Acrylic, The Hygienic Corporation, Akron, OH, USA) was used to modify the cervical portion of the anterior teeth on the maxillary provisional restoration to simulate the pink

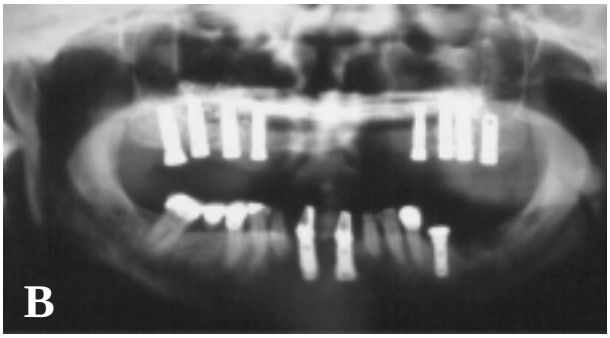


**Fig. 1B** Panoramic radiograph of maxillary and mandibular implants.

gingival porcelain planned for the definitive maxillary anterior teeth. Both restorations were subsequently finished and highly polished. After adjusting for intraoral fit, the provisional restorations were cemented in place using an acrylic/urethane-based provisional cement (ImProv, Nobel Biocare Steri-Oss, Yorba Linda, CA, USA). Four months subsequent to insertion of the provisional restoration, a detailed evaluation of the patient's overall dental condition was undertaken and described as follows: the vertical dimension of occlusion was re-evaluated by measurement of the pronasale-pogonion distance using a cephalometric radiographic taken at the centric relation position. Additionally, extraoral evaluation and comparison with the corresponding pre-treatment records was accomplished. The difference between this extraoral measurement and that previously determined from pre-treatment status (i.e. pre-extraction) demonstrated a 1 mm increase in the vertical dimension of occlusion. Periapical radiographs were made of each implant to evaluate and compare the bone level surrounding the implant fixtures with previous records. No bone loss was found by comparison of periapical radiographs. The oral hygiene was inspected using disclosing agent (The Lorvic Corp., St. Louis, USA) and home care instructions were reiterated. An impression using the transfer impression technique (closed-tray impression technique) was made to fabricate soft-tissue definitive casts for implant-supported definitive restorations. Eleven Steri-Oss 3.8-mm diameter cement-retained Esthetic abutments (Nobel Biocare Steri-Oss, Yorba Linda, CA, USA) were connected onto the definitive casts. The labial margin of the Esthetic abutment was set lower than the lingual margin to improve esthetics of the labial side and enhance biocompatibility of the lingual side. Subsequent to abutment preparation on the definitive casts, a Duralay jig was fabricated to accurately transfer the abutments from the definitive casts to the patient's mouth. Provisional restorations were transferred to the definitive casts to establish the vertical dimension of occlusion on the articulator and to fabricate the customized anterior guide table. A condensation type PVS material jig (Coltoflax, Coltene/Whaledent Inc, Mahwah, NJ, USA) was fabricated as the reference for metal-coping waxing and porcelain packing (Fig. 2A). Once the porcelain work had been completed, the prostheses were inserted and the patient's occlusion was


**Fig. 2A** Polyvinyl siloxane jig for reference of metal copings wax up and porcelain packing.

adjusted. The occlusal scheme for excursive movements was established as brushing contact of the anterior teeth and group function for the posterior teeth. The prostheses (implant-supported, 14-unit maxillary full-arch porcelain-fused-to-metal fixed partial denture, and implant-supported 5-unit mandibular porcelain-fused-to-metal fixed partial denture and single crown) were then cemented in place with an acrylic/urethane-based provisional cement (ImProv, Nobel Biocare Steri-Oss, Yorba Linda, CA, USA). Upon completion of work, the frontal view (Fig. 2B), occlusal views (Fig. 3A and Fig. 3B), and lateral views (Fig. 3C and Fig. 3D) of the maxillary and mandibular arches demonstrated a pleasing esthetic outcome of the definitive prostheses for this patient. Oral hygiene instruction was reinforced with the patient being given an interproximal


**Fig. 2B** Frontal view of definitive restorations in place intraorally.

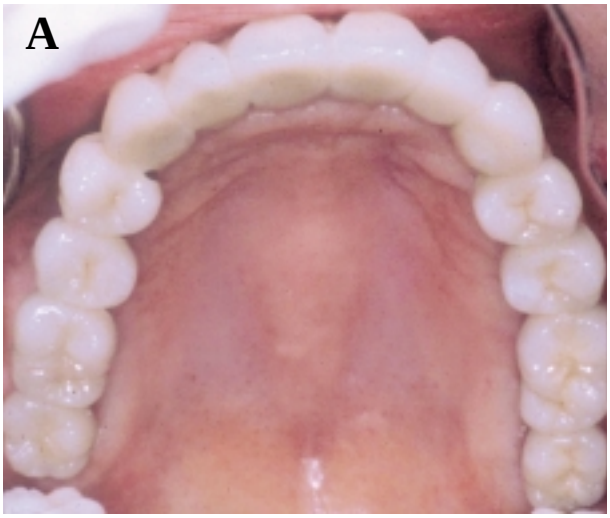


**Fig. 3A** Occlusal view of definitive restorations in maxilla intraorally.


**Fig. 3B** Occlusal view of definitive restorations in mandible intraorally.


**Fig. 3C** Right lateral view of definitive restorations in place intraorally.


**Fig. 3D** Left lateral view of definitive restorations in place intraorally.

brush (Dental Pro, Tokyo, Japan) and sufficient instruction in its use. Further, the patient was requested to set up a recall appointment every 3 months. At the first follow-up visit, the patient reported that the resultant lip support and dental profile provided by the new prostheses were much more satisfactory than was the case previously (Fig. 4A-D), and that her chewing function had improved markedly. At the 3-year follow-up visit, the occlusion of the implant-supported fixed prostheses was stable and osseointegration of 11 implants was intact.

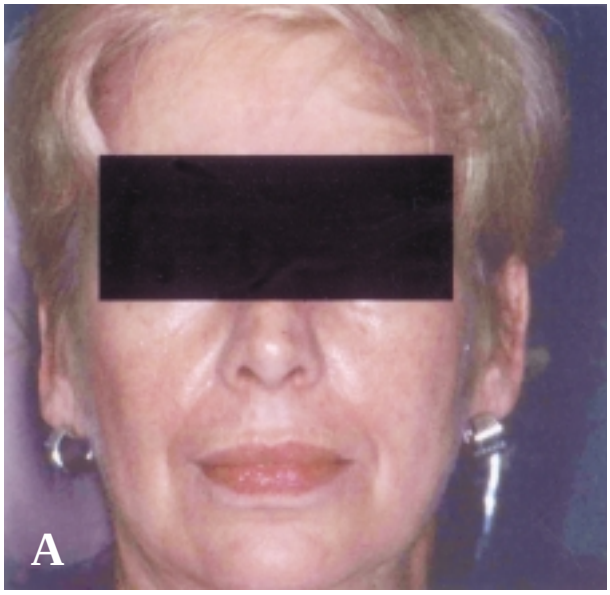


**Fig. 4A** Frontal view of pre-treatment record extraorally.


**Fig. 4B** Frontal view of post-treatment record extraorally.

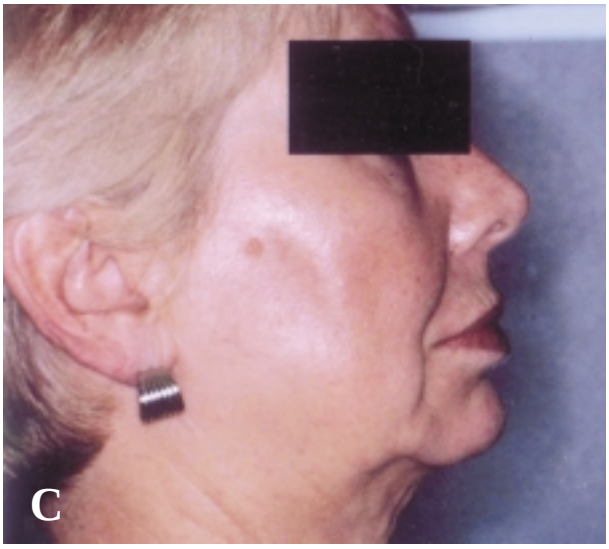


**Fig. 4C** Profile view of pre-treatment record extraorally.

## DISCUSSION

The specific positioning of the implants in the maxilla for a maxillary implant-supported full-arch restoration is an important issue for both esthetic and biomechanical reasons.[8] From an esthetic viewpoint, implants ideally should not be placed in the anterior region to avoid esthetic compromise of the definitive prosthesis. For biomechanical reasons, implant positioning should be distributed among the anterior and posterior regions to decrease the potential for cantilever effects. However, occlusal forces may also be distributed away from anterior implants by balanced posterior contact during excursive movements, thus decreasing the loading of anterior implants.[8] For this patient, the final esthetic appearance was given due consideration at the restoration-planning phase, and the implants placed, in a reasonably evenly spaced fashion, from the maxillary first premolar to the second molar regions. This was done to achieve the best cosmetic result for the anterior teeth. To mask the severe tissue loss of the premaxillary ridge, a pink porcelain design for anterior pontics was planned.

Cement-retained definitive prostheses were selected rather than screw-retained alternatives, to facilitate esthetic and occlusal considerations. The screw opening for such a restoration would occupy between thirty and fifty percent of the occlusal surface, compromising the esthetic result, interfering with the development of optimal occlusion and jeopardizing the axial loading principle of implants.[8] Earlier clinical reports have revealed higher complication rates with a screw-retained prosthetic design as compared to a cement-retained restoration,[9-12]


**Fig. 4D** Profile view of post-treatment record extraorally.

suggesting that cement-retained prostheses may be a better choice for such prosthetic work. The second reason for selecting a cement-retained restoration is that under normal circumstances, an ideal passive fit of the metal framework within the body of the prosthesis is easier to achieve than for screw-retained prostheses. A passive-fitting framework is always preferred for an implant-supported prosthesis, however, dimensional discrepancies in the range of 291 to 357 μm were reportedly found in castings as reported in a study by Misch.[13] Due to the difficulties encountered with casting accuracy, the misfit of screw-retained prostheses may result in a greater level of masticatory pressure being imparted to the screw-retained implant fixtures, with subsequent failure of osseointegration of the prosthesis.[14,15] Conversely, machine-made abutments used for the cement-retained prosthetic design result in a more passive fit. Misch[13] outlined a series of advantages for cement-retained implant prostheses compared with screw-retained implant prostheses. Cement-retained restorations provide a passive stable environment because they are cemented on well-adapted machined abutments with fit discrepancies being negated by the grouting action of the cement. Frameworks of cement-retained design usually may be seated and adjusted by use of routine chair-side clinical procedures and disclosing media. Sectioning and soldering is not a routine procedure as it is for screw-retained castings. The lack of screw holes in cemented prostheses improves esthetics and enhances the physical strength of porcelain or acrylic resin, resulting in less fracture. Additionally, the occlusion can be better developed to facilitate axial loading. Cement-retained implant prostheses result in reduced chair time and provide easier access where vertical space is limited. Reduced costs and complexity of components along with simpler laboratory procedures are important advantages attributed to the cement-retained design.[8]

The ability of the bone-implant interface to survive under loading is a result of many factors. Biomechanics, biomaterials, interfacial loading, and physiologic response are all relevant issues for implant and bone health. In 1988, Brunski[16] clearly defined the enormity of the problem. Many factors interact in a complex manner to produce a load at the bone-implant interface. Axial loading is preferred for implants and the bone-implant interface, and offset loading may be harmful. Although the literature is inconclusive in determining the negative consequences of offset loading on the bone-implant interface, biomechanical principles show that increasing offset loading increases the stress at the bony interface.[17-21] The limit at which the load transfer goes beyond the body's ability to respond positively has not been determined and is unique to the individual implant. The bone-implant interface appears able to survive with some degree of offset loading. The occurrence of offset loading may be increased when using screw-retained implant restorations[22,23] and may be responsible for screw loosening and breakage.[24,25] As such, prudent control of offset loading is suggested through prosthetic design. Because of the apparent advantages of cement-retained design in terms of esthetics and the ability to produce axial loading, we elected to use the cement-retained design for the definitive restorations of this patient.

The benefits of a pink porcelain design for the cervical portion of a definitive prosthesis have been discussed by Potashnick.[5] Such a design was considered for this patient to compensate for the severe soft-tissue and bone loss experienced following tooth removal. Pink acrylic resin was used for the provisional restoration as a prosthetic preview of the final restoration. This alternative could provide a desirable prosthetic solution for patients not expected to benefit from soft-tissue grafting and ridge augmentation.

The luting agent used to cement the provisional and definitive restorations was an acrylic/urethane-based provisional cement (ImProv, Nobel Biocare Steri-Oss, Yorba Linda, CA, USA). It was selected because it is easy to clean up following cementation and for the relative retrievability of the prosthesis for future maintenance.[26-28]

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## REFERENCES

1. Branemark PI. Osseointegrated implants in the treatment of the edentulous jaw experience from a 10-year period, Stockholm. Amquist and Wesell Internat, 1997.
2. Adell RE, Lekholm UJ., Rockler BI. A 15 year study of

osseintegrated implants in the treatment of the edentulous jaw. Int J Oral Surg 1981;10:387-416.
3. Jemt T, Lekholm U. Oral implant treatment in posterior partially edentulous jaws: a 5-year, follow-up report. Int J Oral Maxillofac Implants 1993;8:635-40.
4. Arvidson K, Bystedt H, Frykholm A, von Konow L, Lothigius E. A 3-year clinical study of Astra dental implants in the treatment of edentulous mandibles. Int J Oral Maxollofac Implants 1992;7:321-9.
5. Potashnick SR. Soft tissue modeling for the esthetic single-tooth implant restoration. J of Esthet Dent 1998;10:121-31.
6. Heydecke G, Boudrias P, Awad MA, de Albuquerque RF, Lund JP, Feine JS. Within-subject comparisons of maxillary fixed and removable implant prostheses: Patient satisfaction and choice of prosthesis. Clin Oral Impl Res 2003;14:125-30.
7. Rungcharassaeng K, Kan JY. Fabricating a stable record base for completely edentulous patients treated with osseointegrated implantsusing healing abutments. J Prosthet Dent 1999;81:224-7.
8. Hebel KS, Gajar RC. Cement-retained versus screw-retained implant restorations: Achieving optimal occlusion and esthetics in implant dentistry. J Prosthet Dent 1997;77:28-35.
9. O'Roark WL. Improving implant survival rates by using a new method of risk analysis. Int J Oral Maxillofac Implants 1991;8:31-57.
10. Jemt T. Oesseointegrated implants for single tooth replacement: a 1-year report from a multicenter prospective study. Int J Oral Maxillofac Implants 1991;6:29-35.
11. Jemt T, Linden B, Lekholm U. Failures and complications in 127 consecutively placed fixed partial prostheses supported by Branemark implants: from prosthesis treatment to first annual check up. Int J Oral Maxillofac Implants 1992;7:40-4.
12. Parein AM, Eckert SE, Wollen PC. Implant reconstruction in the posterior mandible: a long term retrospective study. J Prosthet Dent 1997;78:35-42.
13. Misch CE. Screw-retained versus cement-retained implant-supported prostheses. Pract Periodont and Aes Dent 1995;7:15-8.
14. Carlson B, Carlsson GE. Prosthodontic complications in osseointegrated dental implant treatment. Int J Oral Maxillofac Implant 1994;9:90-4.
15. Jorneus L, Jemt T, Carlsson L. Loads and designs of screw joints for single crowns supported by osseointegrated implants. Int J Oral Maxillofac Implants 1992;7:353-9.
16. Brunski JB. Biomaterials and biomechanics in dental implant design. Int J Oral Maxillofac Implants 1988;3:85-97.
17. Rangert B, Jemt T, Jorneus L. Forces and moments on Branemark implants. Int J Oral Maxillofac Implants 1989;4:241-7.
18. Weinberg LA. The biomechanics of force distribution in implant-supported prostheses. Int J Oral Maxillofac Implants 1993;8:19-31.
19. Lundgren D, Falk H, Laurell L. The influence of number and distribution of occlusal cantilever contacts on closing and chewing forces in dentitions with implant-supported fixed prostheses occluding with complete dentures. Int J Oral Maxillofac Implants 1989;4:277-83.
20. Katona T, Goodacre CJ, Brown DT, Roberts WE. Force-moment systems on single maxillary anterior implants: effects of incisal guidance, fixture orientation, and loss of bone support. Int J Oral Maxillofac Implants 1993;8:512-22.
21. Ogiso M, Tabata T, Kuo PT, Borgese D. A histologic comparison of the functional loading capacity of an occluded dense apatite implant and the natural dentition. J Prosthet Dent 1994;71:581-8.
22.Kallus T, Bessing C. Loose gold screws frequently occur in full-arch fixed prostheses supported by osseointegrated implants after 5 years. Int J Oral Maxillofac Implants 1994;9:169-78.
23. Celletti R, Pameijer C, Bracchetti G, Donath K, Persichetti G, Bisani I. Histologic evaluation of osseointegrated implants restored in nonaxial functional occlusion with preangled abutments. Int J Perio Rest Dent 1995;15:563-73.
24. Misch CE. Contemporary implant dentistry. St Louis: Mosby-Year Book Inc, 1993:651-85.
25. Misch CE, Bidez MW. Implant-protected occlusion: a biomechanical rationale. Compend Contin Dent Educ 1994;15:1330-43.
26. Akashia AE, Franciscone CE, Tokutsune E, da Silva W Jr. Effects of different types of cements on the tensile strength and marginal adaptation of crowns on implants. J Adhes Dent 2002;4:309-15.
27. Koka S, Ewoldsen NO, Dana CL, Beatty MW. The effect of cementing agent and technique on the retention of a CeraOne gold cylinder: A pilot study. Impl Dent 1995;4:32-5.
28. Clayton GH, Driscoll CF, Hondrum SO. The effect of luting agents on the retention of the CeraOne implant system. Int J Oral Maxillofac Implants 1997;12:660-5.

# 上顎全牙弓合併下顎部份人工植牙支持固定式義齒之贋復步驟

潘裕華 Lance R Ramp 林敬凱 沈裕福 劉朋儒

由於前上顎骨脊質與量的變化和上顎實解剖型態的變異性造成上顎全牙弓人工植牙支持固定式義齒一直都是一項複雜性的挑戰。如何能順利地進行臨床及技工步驟來得到人工植牙支持式義齒病患的全面滿意 (其中包括配戴的舒適性，講話發音的方便性，及美觀等方面) 是應該我們在人工植牙治療開始前就必須要思考的主要課題。一位 56 歲的中年女性病患由於嚴重進行性的牙周病拔除下顎 5 顆牙齒。11 顆人工植體 (上顎 8 顆，下顎 3 顆) 安排植入患者上顎及下顎齒槽骨中。螺絲固定式上顎全牙弓及下顎部份固定臨時性義齒的製作以決定齒間垂直高度，進行前牙美觀的評估，及開始植體對咬合力的適應。黏膠固定式永久性義齒於臨時性義齒配戴 4 個月後製作完成。在永久性義齒試戴時下顎前突運動及側方運動的咬合調整必須控制得當，口腔清潔教育的強調在義齒裝置之後的維持期也是必須的。(長庚醫誌 2006;29(4 Suppl):76-84)

**關鍵字**：人工植牙，上顎骨脊，顎實解剖型態，絲固定式，間垂直高度，膠固定式。

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