

USE OF NON-RIGID CONNECTION BETWEEN NATURAL TEETH AND IMPLANTS TO SUPPORT FIXED PARTIAL DENTURE. TWO YEARS CLINICAL EVALUATION

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استخدام الوصلات غير الصلبة بين الزرعات والأسنان الطبيعية لدعم الجسر الثابت في ثلاثة مرضى . وتم التقييم السريري للزرعات والأسنان المستخدمة كدعامات للجسور الثابتة على مدى سنتين ، لم يحدث أي تبدل سريري غير طبيعي حول منطقة الزرع أو الدعامات الطبيعية . على أي حال نحتاج إلى مدة أطول للتقييم السريري لهذا النوع من الوصلات .

تم مناقشة الوصلات الصلبة بين الدعامات السنوية والزرعات السنوية المستخدمة كدعامات لحمل الجسر الثابت في المؤلفات .

المشكلة المتوقعة مرافقتها لهذا النوع من الترميمات تعود إلى الافتراض أن هناك فرقا في حركة الأسنان الداعمة الطبيعية وحركة الزراعات الداعمة . وهذا الفرق قد يؤدي إلى أن الزرعات تدعم وزنا أكبر في حين أن الأسنان الطبيعية الداعمة ستكون في وضع غير وظيفي . وقد اقترح بعض الباحثين استعمال الوصلات الصلبة إذا كانت الأسنان الطبيعية تبدي حركة طبيعية . واقترحوا أيضاً تطبيق الحمل تدريجياً باستعمال جسر مؤقت للتقليل من الفشل الذي قد ينتج من الحمل المبكر المطبق على الزرعة الداعمة . لم يتم اقتراح استعمال وصلة غير صلبة مثل الوصلات شبه الدقيقة . وتمت التوصية إلى أن استعمال هذا النوع من الوصلات يسمح باسترجاع الجسر ، ويقلل من الحمل الزائد على الزرعة . على أية حال لا توجد دراسة طويلة المدى على استخدام الزرعة التي تحتوي على وصلة غير صلبة مع الأسنان الطبيعية في دعم الجسر الثابت . هدف هذه الدراسة هو تقديم تقييم سريري للوصلات غير الصلبة بين الأسنان الطبيعية والزرعات المستخدمة في دعم الجسور الثابتة .

Non-rigid interconnection between implant and natural teeth to support fixed partial denture in three partially edentulous patients has been used. Two years of clinical evaluation for both implant and natural teeth abutment was made. There was no clinical abnormal changes around peri-implant zones and peri-radicular areas around any of the abutments. However, a longer period of clinical evaluation is needed for evaluating this type of interconnection.

Rigid interconnection between natural teeth abutments and osseointegrated implant abutments supporting fixed partial denture has been discussed in the literature. The potential problems associated with this kind of restoration are due to assumption the difference in mobility between natural teeth abutments and implant abutments. That difference might lead the implant to support more of the load,¹

while the natural teeth abutments will be in a non-functional situation or sometimes show intrusion of the tooth-borne segment.² Other workers suggested the use of rigid intracoronal connection, provided that natural teeth display normal mobility. They also suggested, progressive loading with long term provisional restoration to minimize failure which might result from premature loading of implant abutments.³ Non-rigid connection has been suggested as semi-precision attachment.^{4,5} It has been recommended that the use of this type of internal

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interconnection might allow retrievability of the prosthesis as well as reducing overloading of the implant. However, there is no long term studies of combining non-rigidly held osseointegrated implants with healthy natural teeth in supporting fixed partial denture.

The aim of this paper was to present clinical evaluation for non-rigid connection between natural teeth and implants in supporting fixed partial dentures.

Materials and Methods

Three male patients with unilateral posterior edentulous areas were used in this study. One of them had left maxillary posterior edentulous area distal to the maxillary left canine and the other two had right mandibular posterior edentulous area distal to the mandibular right canine. Preoperative radiographic examination was made including panoramic films and intra-oral radiographs. After the treatment plan was discussed and informed consents were obtained all patients have agreed to have two osseointegrated implants on each side to support a fixed bridge with mesial natural canine abutment.

Surgical Procedures

Under local anesthesia, mucoperiosteal flap was raised in the maxillary and mandibular posterior segment exposing the underlying bone where implants were planned to be placed. Implant site preparation was carried out using low speed bur with internal and external irrigation. Implant site alignment was facilitated by using an occlusal acrylic stent which was previously fabricated.

A microvent fixture* of a 4.25 mmD/13 mm.L was placed in the site to the level of the bone crest and the flap was sutured with black silk. Patients were given post-operative instruction, medication and one week appointment for suture removal.

After 3 months, implants were exposed for the placement of healing abutment [Fig. 1] and radiographs were taken.

Restorative Phase

Natural tooth preparation design was identical to the tooth preparation for full veneer crown with a

deep chamfer labially with slight over reduction in the distal side, to accommodate the attachment. Prosthetic insert was placed after the removal of the healing abutments. A final impression was taken for the prepared natural tooth abutment and transfer coping of the implant was picked up at the same time. A wax coping on the natural tooth with intracoronal attachment was fabricated in one patient, in the other two patients it was fabricated in a pontic distal to natural tooth abutment. The main connection employs semi-precision attachment.

The matrix connector was placed in the distal of a canine supported abutment [Fig. 2,3]. The matrix portion of the attachment was placed on the mesial of the pontic, seating into the matrix implant connector for the recipient site. The dimensions of the female portion on the natural teeth was determined by the root form and soft tissue depth. The cast was obtained from a wax pattern and the metal frame was tried in the mouth for clinical fit.

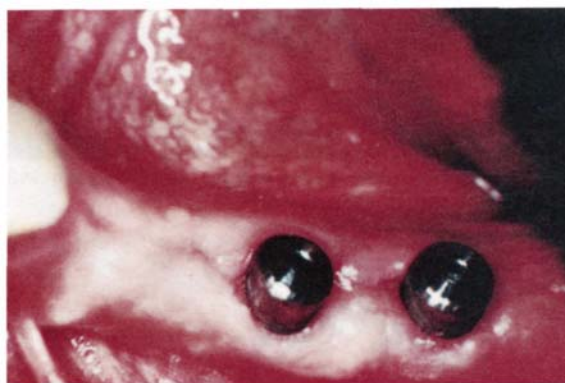


Figure 1. Clinical occlusal view shows one week after placement of healing caps.



Figure 2. Clinical occlusal view shows the female connector placed in the distal of canine supported abutment.

*Coevent Corporation, Encino, California.

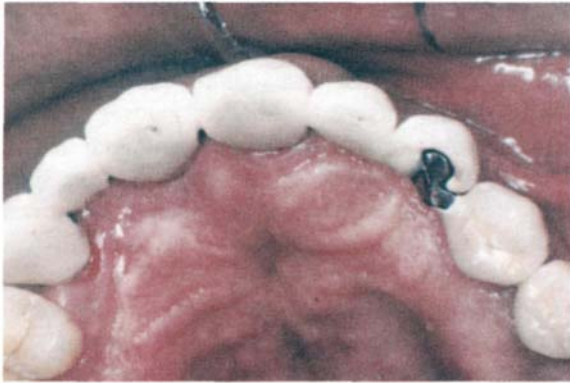


Figure 3. Occlusal view shows the interconnecting joint placed in a cantilever pontics distal to the natural teeth in one of the patients.

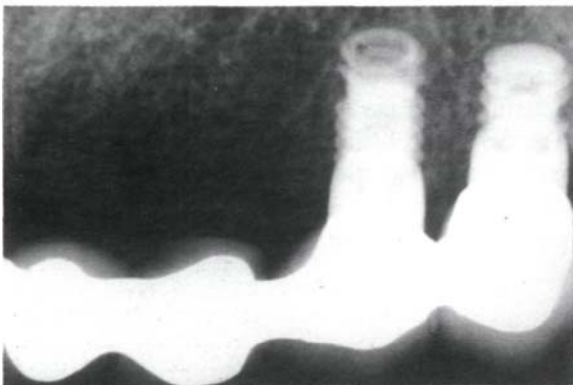


Figure 4. Post operative peri-implant zone radiograph with bridge placed on.

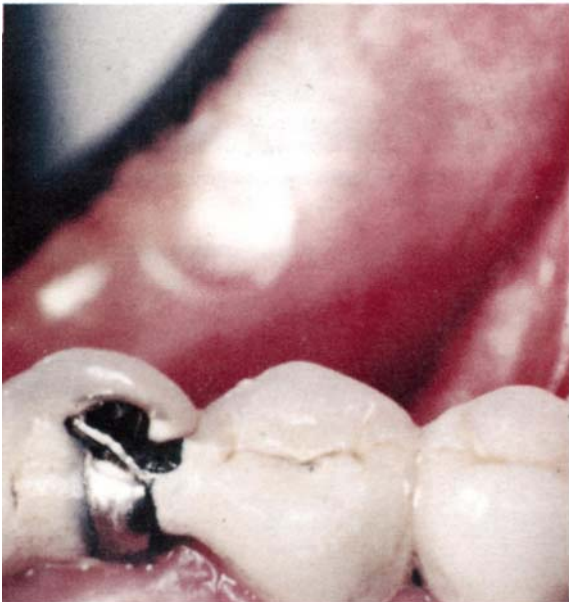


Figure 5. Clinical view for the interconnecting joint two years later. It did not show any discrepancy between connecting male and female portion.

The porcelain application was completed and the bridge was provisionally luted in the mouth. Postoperative radiographs were taken [Fig. 4]. Oral hygiene instruction were given and patients were placed under a recall program every three months for two years.

Results

Patients were recalled at three months, six months, one year and two years for clinical evaluation of natural teeth and implants as follows:

1. Radiographic examination for peri-implanted zone and natural teeth abutment.
2. Testing clinical mobility of implant and natural teeth abutment.
3. Measuring mucosal probing depth around each implant and natural tooth abutment.

Radiographic examination revealed no radiolucency or abnormal changes in peri-implant

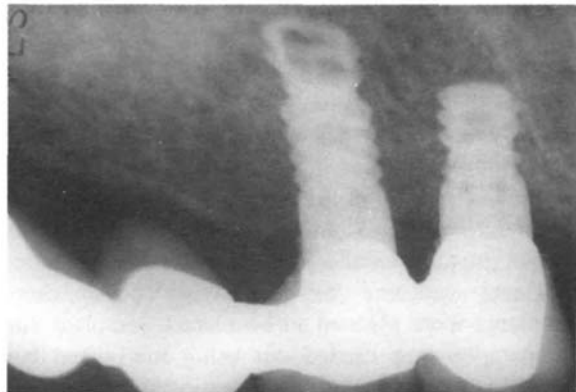


Figure 6. Peri-implant zone radiograph two years later did not show any abnormal changes or radiolucency.

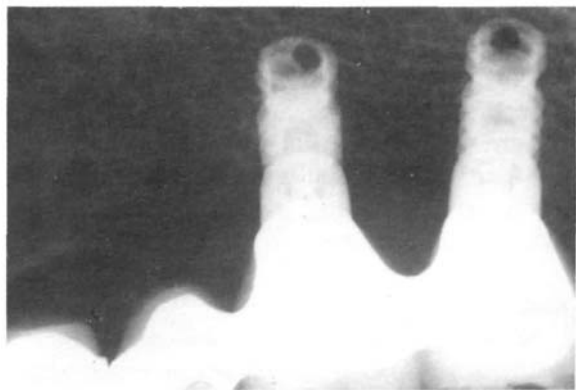


Figure 7. Peri-implant zone radiograph two years later for another patient in the mandible. It did not show any abnormal change or radiolucency.

zone and on periapical areas around each natural tooth abutments. Mucosal probing tooth depth around each natural abutments was less than 2 mm. There was no clinical mobility when tested separately for the implants and natural teeth abutments [Figs. 5,6,7].

Discussion

It has been recommended that when implants are attached to the natural teeth, an interlocking attachment or coping on the natural teeth which will allow retrievability of the prosthesis should be used.⁵ However, long term results of combining non-rigidly held osseointegrated with healthy natural teeth have not been reported. In this study, the interconnection is based on the concept that implants will support natural teeth abutments rather than teeth supporting implants, where the matrix portion attach to the coping on the implant abutment, while the matrix receiving bed is fabricated on coping on the natural teeth abutments, this arrangement will also add to support the bridge against occlusal lift.

In this study, the main non-rigid interconnection employ a semi-precision attachment. Hence, the possible problem of overloading the implant or potential intrusion phenomena that might be associated with tooth migration has not been noticed in the clinical evaluation for two years.

Radiographic examination revealed no radiolucency or abnormal changes in the peri-implant zone of the periapical area around each natural tooth abutments neither there was any clinical mobility of the implants or the natural teeth abutments.

Some studies^{6,7} suggested placing the internal attachment on cantilevered pontics extending from each segment supported by natural teeth and

implants to reduce the stress on implants without overloading the natural teeth. In this study, however, an internal attachment used in one mandibular canine in one patient and on cantilever pontics in the other patients. In a two-year clinical evaluation for this joint type, the natural teeth did not seem to show any apical or labial clinical migration.

The type of occlusal scheme and force distribution as a factor has not been considered in this study. However, a longer period of clinical evaluation of the passive interconnective implant tooth relationship is needed.

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