



Implant News & Views

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Implant Abutments Used as RPD Attachments

by Dr. Ray Voller

With the array of continuing education courses that are available today to the dental practitioner, it is amazing how so few dentists think "out of the box." The use of implants is a prime example of how, as dentists, we "stick to what we see others do that works." In addition, as materials and techniques continue to evolve, the profession focuses more attention to esthetics and the elimination of metal in the smile zone. These more up-to-date procedures, however, sometimes fail to implement the most obvious and simple processes that incorporate simplicity into our patients treatment planning.

Most recently, increasing success utilizing implantology has provided the dentist with more freedom and confidence in developing treatment that provides the patient with the prosthetic replacement of single or multiple teeth. Some of the biomechanical principles of implant loading also can lend themselves extremely well as to their use in the design of abutments for removable prosthetics. It is the author's contention that these underutilized procedures frequently can be used as an additional approach for those patients who are not candidates for multiple implants either because of financial constraints, or because of the inability to place the implants in suitable bone.

Force Vectors

When one reviews the literature related to the success/failure rate of implants, many of these failures can be directly attributed to improper loading. Destructive force vectors placed in directions other than the long axis of implants and, in addition, improper (excess) crown to root ratios also can contribute to the failure of implants. It is the author's opinion that to utilize implant abutments placing the axis of force intraosseus, rather than supraosseus, can contribute to the longevity and success of the majority of implants used

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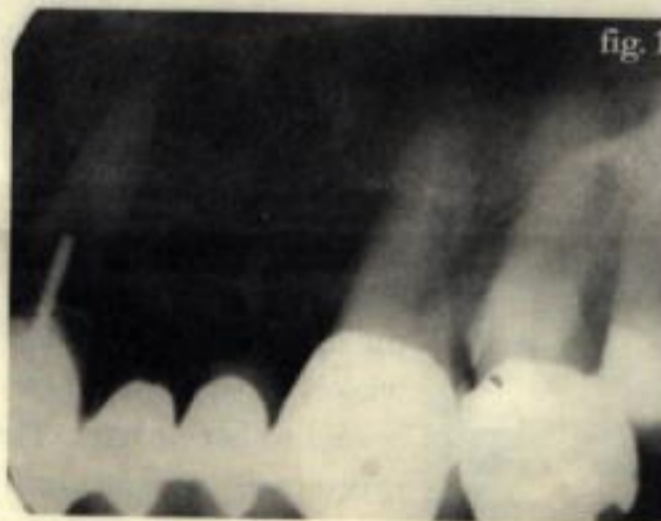


fig. 1



fig. 2



fig. 3

Implant Abutments Used as RPD Attachments

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as abutments.

A prime and, often underutilized, application of implants is the "trailer ball" RPD attachment. Force vectors for these applications are minimized, and in addition, their design lends itself extremely well to simplified oral hygiene. The cases presented here are examples of how the practitioner can esthetically and functionally provide a predictable and manageable treatment for a patient with high expectations of a youthful smile.

Indications

Indications for this would be anytime there is a need for an esthetic attachment/abutment for an RPD and the need to lower the axis of rotation is indicated. Cuspids have the potential to have a lot of additional forces upon them so they make excellent candidates for this type of implant attachment.

Contraindications would be the same as for any implant, including insufficient bone and/or interocclusal space. A minimum of 6 mm is necessary for this to fit interocclusally.

Case 1

The patient presented initially to our office with numerous failing full porcelain, porcelain fused to metal and full gold crowns [fig. 1]. She also possessed a conventionally designed maxillary and mandibular removable prosthesis to replace several posterior teeth. Unfortunately, the upper left cuspid, which had served as an anterior terminal abutment for a fixed partial denture was non restorable due to decay [fig. 2]. In an effort to provide her with a metal free smile, implants were discussed as an option to replace her upper dentition in the smile zone.

Treatment Plan

The amount of adequate bone in the area of the maxillary bicuspids, however, was not sufficient to provide us with what we felt would be a long-term successful restoration. Bone grafting was also discussed; however, the patient refused. Subsequently additional records that included a wax-up of the proposed restoration were obtained, and the implant was treatment planned in the area of tooth #11. It was decided that implants would not be placed in the bicuspid areas distal to #11, because she was treatment planned for an RPD anyhow due to so many other missing teeth, and we really didn't need any more implants than the one in the #11 area for the RPD attachment.

Since the cuspid root was still intact, the remaining bone was ideal for the placement of a single tooth implant in this area. Once the decayed root was extracted, several months passed, during which time, the patient underwent re-treatment of her remaining dentition. A 4mm X 10mm deep thread microporous implant [Osteo-Implant Corporation] was placed approximately three months after the extraction of the cuspid, using the conventional approach, which included a surgical stent for correct angulation and positioning. The attachment is a standard O-Ring system kit, with a 6 mm cuff. These are indicated specifically for retaining overdentures when resilience and facilitated oral hygiene are desired.

The removable partial was later designed and also constructed to incorporate the customized milled attachments of her newly placed crowns. Tooth positioning and the metal framework design of the removable partial denture were done to accommodate the trailer ball attachment in the area of tooth #11 [fig. 4].

Stress

At the delivery appointment of the partial denture, the female attachment holder was located and placed intraorally with self-cure acrylic [figs. 4-5]. After final curing, the retention of the partial denture was remarkable in this area. In addition, the minimal resiliency of the trailer ball attachment area lends itself extremely well as an ideal occlusal stop. This restoration was almost as ideal as a fixed partial denture, given it's relationship to a tooth borne, yet stress broken abutment situation, with the terminal abutments being extremely stable and functional. It is the author's opinion that the connection between natural teeth and implants should always be stress broken, and the treatment example presented here is a perfect example of such.

If one further evaluates this example, it's obvious that the amount of stress that is being placed on the implant is minimal in all directions. In addition, the force vectors that often lead to failure of many implant abutments are minimized.



fig. 4



fig. 5

Case Studies

Implant Positioning and Abutment Correction

by Dr. Ray Voller

The patient presented with a maxillary non-restorable cantilevered bridge with molar #3 abutted off the two bicuspids [figs. 1-2]. The decay on the mesial abutment #5 was pretty extensive, so we decided to extract this tooth and place an implant. The decay on tooth #4 was not extensive enough to necessitate extraction, plus the floor of the sinus was pretty close at that point. Since the patient elected not to alter the sinus, we decided to place an implant in the place of tooth #5 and re-restore #4.

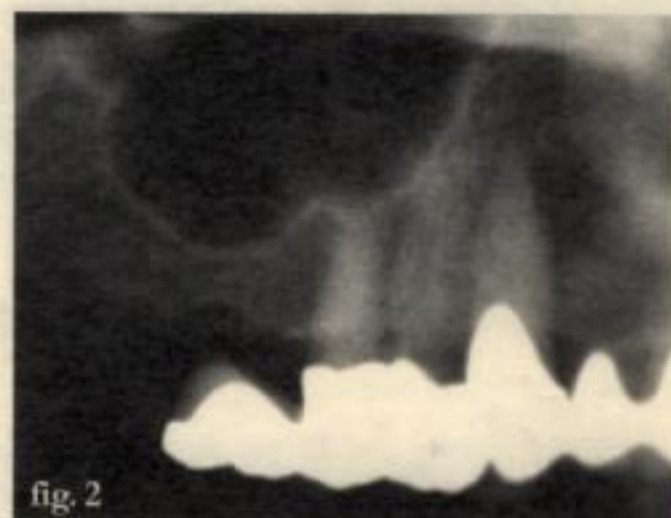
This implant angulation on tooth #5 was not the very best. I don't fault the surgeon, because he placed it in the most favorable bone possible. [Lighten up on your surgeon; he too wants the implant to be successful; but sometimes he thinks like a surgeon, and not like a restorative dentist]. Because of the compromised implant position to accommodate the sufficient bone, the abutment and the restoration had to be inclined or redirected.

Since the patient was interested in having her full mouth reconstructed, we chose a brighter shade for this quadrant. That's why the shade is lighter than the anterior restorations.

A great lab can really pull something out of the fire! Have your lab make a little Duralay pattern to help place the most distal abutments [figs. 3-4]. Also, there's a hole in the pattern to screw it down [fig. 5]. If the crown to root ratio with your abutment is around 1:1, make your contact against the adjacent tooth flat and large to help support your restoration.

So with a UCLA wax-to type of abutment, made by Osteo-Implant Corporation [New Castle, PA - 800.654.5560] we had a custom abutment fabricated that redirected the angulation for ideal positioning in relation to the adjacent natural dentition. My lab, Bill Thomas and Associates, [Cleveland Georgia -

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Implant Positioning and Abutment Correction

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706.865.9703], constructed both the custom abutment [fig. 6] and the full porcelain to metal crown [figs. 7-8], which actually looks nicer than the adjacent natural tooth restoration on tooth #4. How about that! Supra-gingival margins on natural teeth are the standard in my mind to allow for proper hygiene and to preclude periodontal problems with biologic width considerations. Since it's not an esthetic compromise for this patient due to the location, it works fine for her.

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Treatment planning the esthetic zone can be perplexing. Many times, the cuspid is one of the most stable teeth left in the arch; however, if it is missing, the above example of using a trailer ball over implant is an excellent long term, and predictable solution to this situation.

This patient had a number of mandibular teeth that were beyond repair [fig. 6]. She presented to me with teeth #'s 18, 20, 29, 30 and 31 missing [figs. 7-8]. The patient refused bone grafting to place additional implants posteriorly, but she needed more teeth in the posterior mandibular area to occlude with the maxillary posteriors. So the treatment plan was to place Centerpulse 3.5 X 10mm implants in #'s 20 and 29 areas [figs. 9-14] and use Zest Locators on the implants to secure an RPD without clasps, using trailer balls on the implants. Since the abutment on the #20 area was a smaller diameter, this would lessen the torque on this implant too.

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fig 6- upper arch almost done; pre extraction.



fig 7

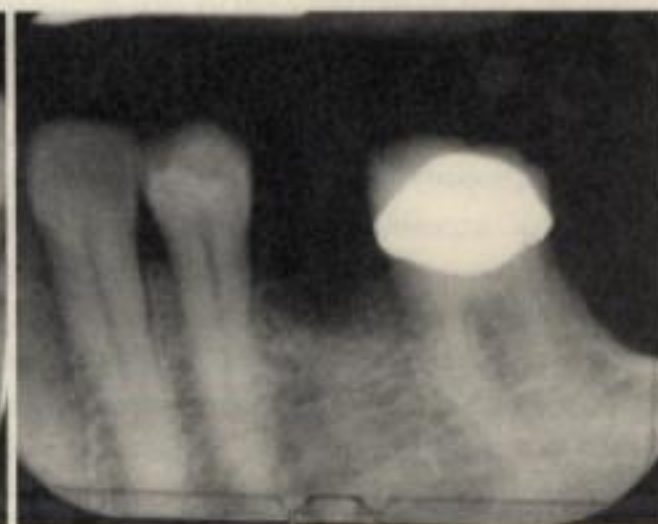


fig 8



fig 9

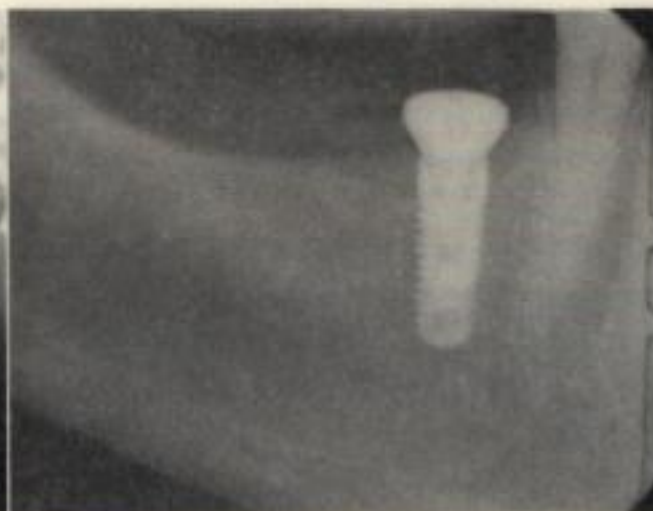


fig 10

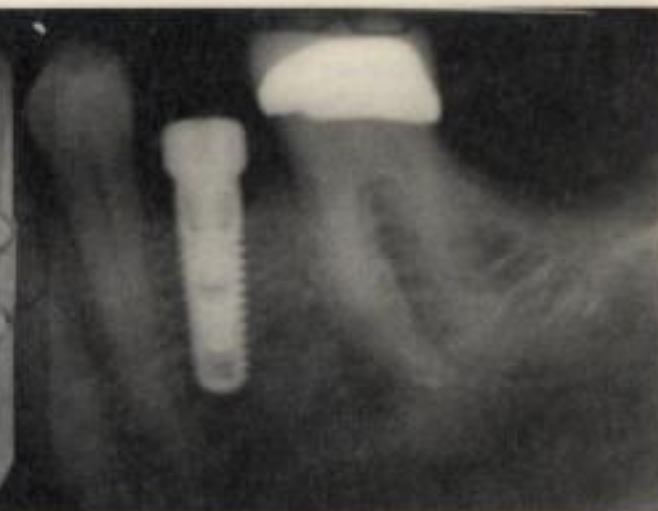


fig 11



fig 12



fig 13



fig 14

Special thanks to these periodontists for the implant placements. Case 1 – Dr. Gary Egler, Case 2 – Dr. Jim DiPerna