

## Precision Attachment: Retained Overdenture

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Received: 1 December 2010 / Accepted: 18 August 2011 / Published online: 28 August 2011  
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**Abstract** Precision attachments are small interlocking devices to connect prosthesis and abutments that offer a variety of solutions to the challenge of balance between functional stability and cosmetic appeal. Precision attachments have wide applications, used in fixed removable bridge, removable partial dentures, overdentures, implant retained overdentures, and maxillofacial prosthesis. Attachment retained overdentures helps in distribution of masticatory forces, minimizes trauma to abutments and soft tissues, attenuate ridge resorption, improves the esthetics and retains proprioception. The following case report discusses the use of resilient stud attachments to retain maxillary and mandibular overlay complete dentures.

**Keywords** Attachments · Overlay/overdentures · Hybrid dentures · Snap fasteners

### Introduction

Prosthodontic rehabilitation of a patient with few teeth remaining is challenging. Any conservative treatment that can delay or eliminate future prosthodontic problems should be considered [1]. Complete denture patients are generally unsatisfied due to the movement of the denture which may be related to resiliency of the supporting tissues or inherent instability of dentures during functional and

parafunctional movements [2]. In spite of rapid development and success rate in the field of implantology, preservation of natural teeth or roots is more desirable which supports Devan's dictum. Overdenture is a complete or partial denture prosthesis supported partly by soft tissues and partly by retained natural teeth roots or implants is a viable option when compared to the conventional complete dentures. Overdenture increases the retention, stability and support, improves the masticatory efficiency, preserves the alveolar bone and muscular patterns [1] and preserves sensory receptors within the periodontal ligament which increases manipulative skills in handling the denture [3]. Retention and stability of overdentures can be improved by attachments or magnets. Attachments for overdentures are classified as studs or bars which can be rigid or resilient. Stud attachments (Rhein 83 srl, Bologna, Italy) consist of matrix (a sphere with a flat head) available in preformed plastic patterns which cast to copings on abutments and matrix (Elastic rubbers) made of nylon and Teflon available in different colours corresponding to different retention degrees, both in normal and micro sizes.

### Case Report

A 55 year old male patient came to the Department of Prosthodontics, SVS Institute of Dental Sciences, Mahabubnagar with a chief complaint of multiple missing teeth and inability to chew the food. His medical history was not significant. On oral examination he had few remaining teeth showing supra eruption, tilting and mobility (Fig. 1). After clinical and radiographic examination (Fig. 8a), the diagnostic casts were studied which showed sufficient interocclusal space to accommodate the stud attachments. Treatment plan included extraction of teeth with poor

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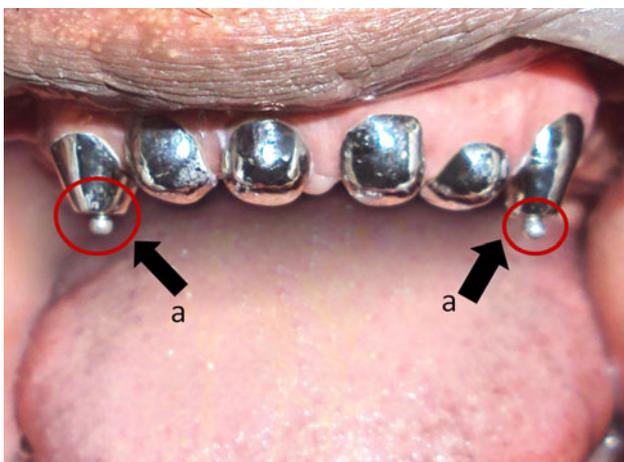
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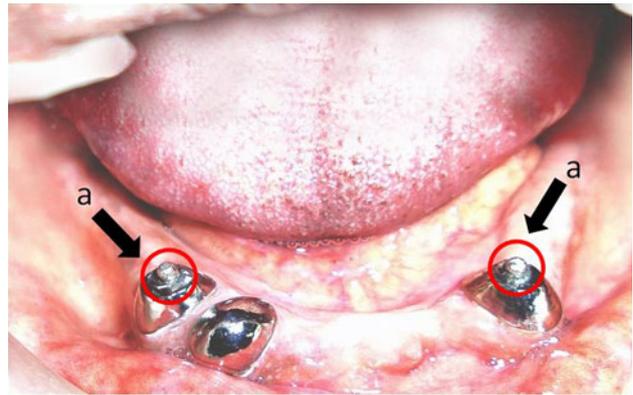


**Fig. 1** Pre-operative view

prognosis, root canal treatment for the retained teeth and fabrication of attachment retained overdentures. 13, 23, 33 and 44 were selected as abutments for attachments. One month after surgical, periodontal and endodontic treatment, the abutment teeth were prepared for short copings. After preparing the post space, impressions were made with addition Silicone (Aquasil LV, Dentsply, Caulk, Germany) for indirect technique. Prefabricated plastic patterns of matrix were attached to the waxed up copings on abutments using parallelometer and were casted (Figs. 2a, 3a). Copings were checked for the fit (Figs. 2 and 3) and pick-up impressions were made with an addition silicone (Aquasil soft putty/regular set and Aquasil LV, Dentsply, Caulk, Germany). Wax patterns were prepared for metal denture bases on refractory cast and casted in cobalt chromium (Wironium, Bego, D 28359 Bremen, Germany) with prefabricated housings for matrix (Fig. 4a) in the region of abutments. Metal denture bases were checked for fit (Fig. 5). After recording maxillomandibular relation,



**Fig. 2** Copings checked for fit. **a** Matrix over copings on abutments



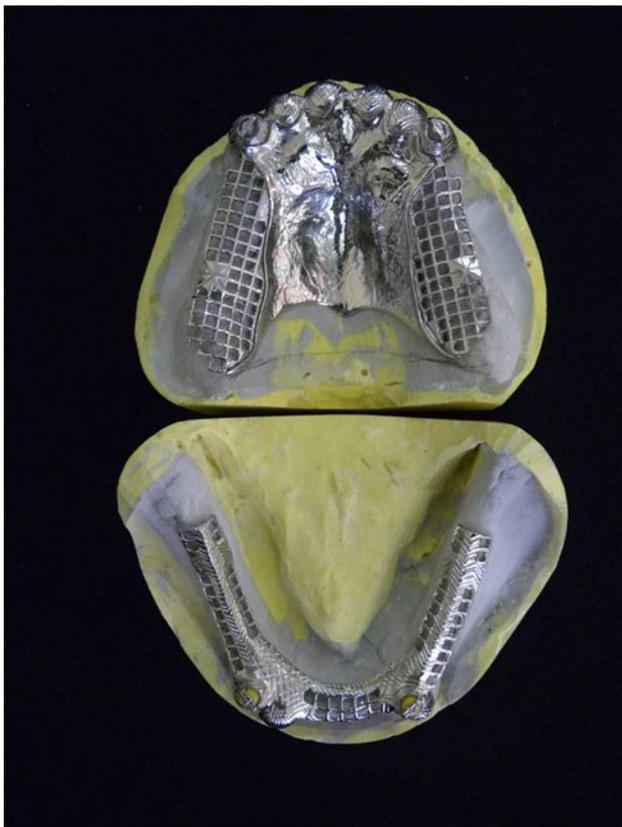
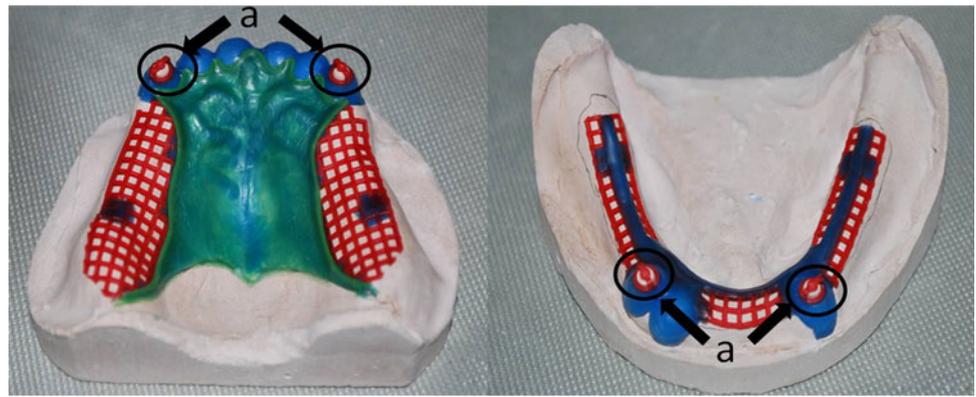
**Fig. 3** Copings checked for fit. **a** Matrix over copings on abutments

try-in was done and overdentures were fabricated (Fig. 6). Abutment teeth were treated with topical fluoride gel (Fluorovil Gel, Vishal Dentocare Pvt. Ltd., Gujarat, India). Cementation of the copings was done with light cure resin cement (Multilink system pack, Ivoclar Vivadent AG, FL-9494 Schaan/Liechtenstein). Dentures were delivered after necessary occlusal error correction (Fig. 7). Post insertion instructions were given and patient was recalled after 1 week, 1, 3, 6 and 12 months interval to evaluate the abutments and periodontal tissues (Fig. 8b).

## Discussion

The edentulous state disturbs the integrity of the masticatory system with adverse functional, esthetic and psychological sequelae [2]. When a patient present with few remaining teeth not ideally located to support fixed partial denture or removable partial denture attachment retained overdenture could be a better option. Other options of treatment could be magnetic retained overdentures or implant supported overdenture. Bar attachments compared to stud attachments require more amount of interocclusal space, unesthetic due to the bulkier denture base and anterior teeth arrangement will be difficult. Various Stud attachments are available which are selected based on vertical space available, crown/root ratio, type of coping, number of teeth support, amount and quality of bone support, location of abutments, type of opposing dentition, angulation of the root to the occlusal plane, chewing pattern and the musculature of the patient and patient desire [4, 5]. Rheins stud attachments were used in this case due to their simplicity in design, ease in maintenance and minimum leverage. Resilient attachments permit vertical movement during mastication reducing stress transfer to the abutments (stress breaking function) and direct the forces to the residual ridge acting as stress redirectors [6]. The abutment selection also plays a vital role in the

**Fig. 4** Maxillary and mandibular wax patterns.  
**a** Prefabricated Patrix housings



**Fig. 5** Metal denture bases checked for fit

prognosis of overdentures. Anterior teeth have less chances of formation of infra bony defects or craters because the cortical plate and the alveolar housing are often fused without spongy bone in between [7]. Amongst anteriors, canines are the most important proprioceptive organs, the shape and strategic position and the larger periodontal attachment area make them ideal abutments [1]. Retained roots primarily help in retention and positional orientation of the prosthesis, so the attachments should be precisely oriented to the copings and metal denture base during casting [8]. When the teeth are devitalised and used as secondary abutments the occlusal forces are transmitted as

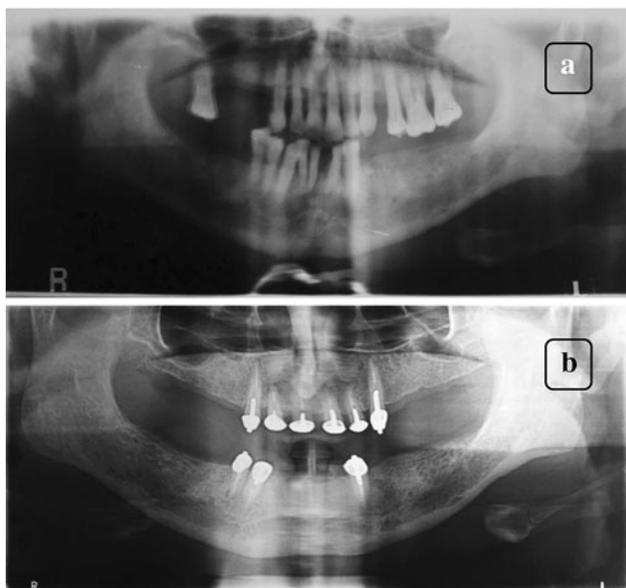


**Fig. 6** Intaglio surface of dentures



**Fig. 7** Post-operative view

tensile load to the underlying bone by the periodontal fibres which is conducive to bone repair and reduces or delays resorption of alveolar bone [9]. The metal denture is less subject to breakage, denture supporting tissues respond more favourably to metal base which may be related to greater ease in maintaining cleanliness of metal base and to effective transmission of thermal changes through the



**Fig. 8** Orthopantomograph **a** Pre-operative, **b** Post-operative

metal base [10]. Patient was satisfied with the dentures at follow-up.

### Conclusion

Precision attachment retained overdenture provide a better treatment modality in preventive prosthodontics for edentulous patient if the patient is properly motivated regarding

the maintenance of oral hygiene. The choice of attachment should be based on the pattern of stress distribution from these attachments through the abutments and other structures and not the retention and stability. The patient's physiological dimension is maintained through the preservation of teeth and bone.

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