

Implant supported restoration using telescopic technology

Discusses implant supported over dentures

Geriatric dentistry has raised its awareness due to longer life expectation. Patients with previous history of edentulism and midterm life expectation can request and expect today higher chewing efficacy as well as higher levels of self confidence when socialising. This can be achieved with implant supported dentures. Primary focus is based on the lower jaw due to muscular insertions, minimal suction performance achievable and higher risk of mobilisation.

Schwartz- Arad (2005) researched the long term success of implant supported over dentures and concluded: "Implant survival rate was 96.1 per cent (11/285 did not survive) and total 10-year cumulative survival rate was 95.4 per cent (maxilla, 85.5 per cent, mandible, 99.5 per cent)."

The edentulous lower arch presents unique challenges, especially when it is in a state of advanced atrophy. Most common, clinical situations still present sufficient remaining bone height in the interforaminal region.

This article aims to familiarize the readership with telescopic (double crown) implant supported dentures. The telescopic or double crown technique consists of two crowns, one fixed (cemented or screw retained) and a second one mounted in the denture.

Two major double crown systems most common used are:

1. The conical crown system
2. The parallel - sided crown system

The conical crown system

Retention is gained using available spring tension of outer crown covering a cemented inner crown. Ideal taper degree of 6° has been described for precious alloys (achieving a retention force of 5-10 N).

The reduction of the taper degree may increase retention force while a higher convergence angle decreases it. This is of importance once multiple retainers used while allowing for adequate values to easy handle (for the patient) and not at the expense of retention loss while chewing.

The parallel-sided crown system

Retention in parallel sided

crown relies on the friction gained through opposing surfaces of both inner and outer crowns and it is mandatory to achieve a clear fit between both crowns to reach the desired retention force.

When considering current available materials and technology to manufacture telescopic crown retention, Beuer et al. (2010) concluded: "Primary crowns made of zirconia showed higher retentive forces than crowns made from gold alloy." Weigel et al. described adhesion between primary crowns made out of zirconia and secondary ones manufactured in galvanofforming approach.

CadCam technology has successfully entered the telescopic crown arena and will have a huge impact in advancing it in the future.

Benefits

Benefits of telescopic double crown technique for the retention of removable partial dentures include:

1. The telescopic crown system acts as tight retention unit
2. The telescopic crown system assures the needed rest of the RPD
3. The telescopic crown system acts as guiding plane for the RPD when removing and reinserting the RPD
4. The telescopic crown system represents a resistance unit for the RPD
5. Ease to treatment plan when compared to other devices
6. High foresighted planning: in an event of implant failure - chair side extension and continuation of function guaranteed. The more units the higher the long term success rate
7. Simple access to oral hygiene
8. Higher freedom of implant placement (position, etc.)

Disadvantages

1. Patient needs preoperative explanation of aesthetics when RPD out of the mouth
2. Costs could be high as it is a fact that that best retention values achievable only with high precious alloys (a taper degree of 5-6 guarantees adhesion values of 5-10 N) - alternative materials are zirconia primary crowns and galvanofforming secondary ones.

The combination of the telescopic crown system with implants to support and retain dentures is a procedure with adequate history in implant retained prosthodontics. The author's case presents a clinical case using the implant

abutments as primary and galvano formed secondary copings.

Case presentation

A healthy 75-year old female patient (nonsmoker) with a history of 16 years of edentulism was referred by her general practitioner complaining from reduced stability and insufficient retention of her mandibular denture. No medical impairments were notified.

Radiographic examination proved a remaining mandibular height in the symphysis region of more than 12mm.

The patient was informed about the treatment options (fixed bridge on 4-6 implants vs. re-

movable over denture on two or four endosseous implants). Benefits and disadvantages were explained, postoperative compliance and oral hygiene requirements explained and discussed. Treatment decision was taken based on patients desire to easy maintain oral hygiene. After financial evaluation and acceptance of agreed treatment a written informed consent was obtained.

For soft tissue reconditioning and bite optimisation new upper and lower dentures were done.

Once full diagnosis was gathered and mounted study casts obtained implant position was elaborated and a surgical guide manufactured.

Four Biohorizons Maestro implants (external hexlock) were inserted under local anesthesia, in the interforaminal region according to classic protocol and excellent primary stability registered. The wound was sutured and the patient requested not to wear prosthesis for 8 days.

Standard postoperative treatment was composed of analgesics and chlorhexidin 0.2 per cent mouth rinses, but no antibiotics. Healing concluded at no complications. The lower denture was soft relined at suture removal.

The second stage surgery (reentry) was performed three months later. A working cast was created two weeks later using an alginate impression and a custom open - tray manufactured. The two piece implant transfer system was utilized for the open tray impression.

The upper jaw cast was mounted in to the articulator using a face

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bow. The lower bite registration rim (created on the master cast) was used to three dimensionally correct mount the lower arch into a semi adjustable articulator. Abutments were delivered by the dental laboratory for try in and pick up impression. Prior to the impression a second bite was registered for verification purposes. Secondary copings were performed using galvano forming. Try in with in wax mounted acrylic teeth proved the correct-

ness of all treatment steps.

The delivery session has been documented and is presented in this paper.

The clinical pictures below were taken at the delivery session.

Authors' conclusions

A possible loss of retention has been discussed in the literature due to possible mechanical wear of the copings. With tapered construction the

blockage of the parallel walls occurs just short before definitive set. This contributes to a reduced material wear.

After having restored multiple cases of lower jaw edentulism with implant supported either removable or fixed prosthetic devices over the last two decades, one of the major benefits the author has come across was the soft tissue condition during the years of compliance. Soft tissue in bar restored cases tends

to become hyperplastic closing the gap to the bar and impairing regular oral hygiene. In cases of implant retained RPD with tel-

escopic crown retention oral hygiene was easy to be maintained and no changes from baseline, associated hard tissue values were always stable. DT



OPG demonstrating ideal healing conditions of the implants



Clinical picture proving optimal gingival condition prior to delivery.



Picture showing the double crowns (secondary copings) mounted in the denture base.



Clinical picture showing the vestibular aspect of the methyl methacrylate based denture.



The implant registration splint is used as a transfer and positioning key for the abutments (primary copings as well).



Positioning keys and abutments in situ.



Picture showing the high precious alloy abutments which serves as primary crowns for the double crown (telescopic) retention.



Clinical picture of the abutments screwed in place having the screw accesses closed.



OPG showing perfect fit of the abutments.



At the end: a satisfied, happy and self confident patient!

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