

# TREATMENT PRINCIPLES FOR RESTORING SINGLE-TOOTH POSTERIOR EDENTATION THROUGH IMPLANT-PROSTHETIC TREATMENT

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**Keywords:** single-tooth posterior implant, post-implant monitoring

**Abstract:** Objective: Obtaining continuity at the level of the dental arch, in case of a single-tooth posterior edentation, by means of implant-prosthetic restorative treatment that does not harm the adjacent teeth. Analyzing the results regarding the implantation aesthetics and functionality as compared to the classical approach techniques, of single-tooth posterior edentation. Material and method: The study was conducted on a group of 5 patients, with fixed implant supported prosthesis, in the posterior maxillary area, of both genders, between 20 and 50 years old. Results: The statistical data obtained let us argue that the arch restoration therapy through implant-prosthetic treatment of single-tooth posterior edentation, is, indeed, the optimum treatment, in cases where the bone structure allows. Conclusions: In order for the implant-prosthetic treatment to be successful, it is essential to clearly identify the outcome prior to the project. There are many factors involved, which make the task of replacing a single tooth in the posterior area to be one of the most challenging restorations in dentistry.

**Cuvinte cheie:** implantul unidentar posterior, monitorizare postimplantară

**Rezumat:** Obiectiv: Obținerea unei continuități la nivelul arcadei dentare, în cazul unei edentații unidentare posterioare, prin tratament restaurator implantoprothetic care să nu lezeze dinții adiacenți edentației. Analiza rezultatelor privind estetica și funcționalitatea implantării comparativ cu tehnicile de abordare clasică a edentației unidentare mandibulare. Material și metodă: Studiul a fost realizat pe un lot de 50 de pacienți, care prezentau restaurări protetice fixe pe implanturi, în zona maxilară posterioară, de ambele sexe, cu vârsta cuprinsă între 20 și 50 de ani. Rezultate: Datele statistice obținute ne fac să susținem că terapia de reconstrucție a arcadei prin tratament implanto-protetic a edentației unidentare posterioare, reprezintă varianta optimă de tratament atunci când oferta osoasă permite acest lucru. Concluzii: Pentru reușita tratamentului implanto-protetic este esențial ca rezultatul final să fie identificat cu claritate încă înainte de începerea proiectului. Mulți factori fac ca înlocuirea unui singur dinte în zona posterioară, să fie una dintre cele mai provocatoare restaurări din stomatologie.

The posterior regions of the edentulous ridges often require the replacement of a single tooth.

The lateral area and the terminal one are the ideal places for surgical and prosthetic experimenting in the field of implantology.

Compared to the anterior area, the restoration of posterior teeth has some advantages:

- the width of the initial alveolar ridge is larger in the posterior area than in the anterior one;
- the vestibular wall is denser and more bulky allowing implants of 4-5 mm;
- the aesthetic appearance of the cervical area of the posterior teeth including the spaces between the teeth and the gum buds are less demanding than in case of the anterior aesthetic areas;
- the aesthetics of the crowns contour, of the emergence profile of the crowns as well as of the colour shades are less demanding;
- placing an implant in a side single-tooth edentulous space exempts the prosthodontist of the preparation of adjacent teeth with all the advantages deriving from it.

There are some inherent disadvantages as far as the prosthesis of the posterior edentulous area is concerned, such as:

- the high degree of resorption;

- the presence of the mandibular canal;
- the poor bone quality;
- the presence of sinus floor against the large forces developed during the dental function.

When the mesial-distal dimensions of the molar are between 8-13 mm, the insertion of an implant with regular sizes, of 4 mm, is not recommended.

When the mesial-distal dimensions of the edentulous space are bigger than 13 mm, two implants of 3.75 mm would reduce the biomechanical stress better than the insertion of a single implant.

The major disadvantage of placing two implants is the limited space between the implants and tooth abutments in case there is not a mesial-distal space of at least 13 mm. If we place two implants of 4 mm, there will be a space of 1.5 mm left between the implants, or between the implants and the adjacent teeth. This space ensures the bone vitality, is appropriate to the crowns contour, it also ensures the vital space for papilla development and also permits proper oral hygiene, but there remains too little space to prevent surgical errors.

Additional space can be achieved in several ways:

- the proximal contours of adjacent teeth are polished to increase the mesial-distal size;
- orthodontics;

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- the diagonally implant placement which saves 0.5-1mm.

It will take into consideration occlusion and oral hygiene.

Many restoring dentists consider that is not recommended to replace a single tooth in the case of the molar single tooth edentation at the level of the second molar.

They bring at least two arguments:

- the large number of occlusal contacts distributing large masticatory forces to the prosthesis components: crown, abutment, connection screw, implant-abutment, the implant platform and body.
- the enlargement of the occlusal surface is bigger than the reception area of the surface of the implant platforms which can be between 4-5mm depending on the quantity of the vestibular-oral bone offer.

Prior to implant insertion, an evaluation of the pre-implant site must be conducted. This means measuring the mesial-distal space of the second molar. After a while since the second molar extraction, the third molar suffers a vertical migration by tilting toward mesial, toward the edentulous space.

Under these circumstances the mesial-distal space at the level of the occlusal surfaces reduces.

The prosthesis will have the shape and the size of a premolar, with a smaller occlusal surface having safer biomechanical results.

Therefore, in the case of such slightly inclinations of molar 3 toward the edentulous space we do not recommend the orthodontic intervention for the distal reposition of it. This procedure will create a mesial-distal space, the size of a molar, which will force us to shape an implant crown with large occlusal surface, unbearable for one implant.

Which are the shortcomings of single tooth molar prosthetic implant?

- for a single missing maxillary molar the limiting factor is the vertical bone height, the distance from the edge of the ridge to the floor of the maxillary sinus;
- for a single missing mandibular molar the limiting factor is the height of the bone above the inferior alveolar nerve knowing that the apex of the implant has to stop at 2 mm from the upper cortical of the mandibular canal.

Which is the single molar implant placement position?

- the molar implant is centred exactly in the middle of the mesial-distal dimension to direct forces closer to its long axis;

The insertion of the implant in a more mesial or a more distal position creates a crown with the console towards the larger space which tends to strain the abutment retaining screw, to loosen or to tear it.

What is the number of implants that can be inserted in a molar edentulous space?

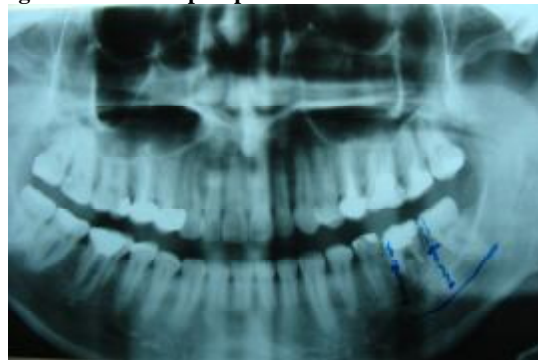
- it is recommended to place two implants for replacing and simulating the two missing roots of the molar; when the mesial-distal anatomical limits are not sufficiently generous this is not feasible;
- when the implant site is deficient (migration of molar 3, excessive abrasion of adjacent teeth, bucco-lingual resorptions) the implant insertion will be abandoned;
- if the technical solutions for assembling two implant abutments cannot be applied the alternative with two implants must be abandoned;

- if the implant inclination is too large or proximity problems with adjacent teeth appear, the alternative with two implants must be abandoned;
- the alternative with a single implant ensures the success of the reconstruction provided that an implant with a diameter larger than 5 mm is inserted;
- when the single missing tooth is the most distal molar, we recommend two implants instead of one. Two implants are more appropriate where there are missing molars since the occlusal requirements justify it.

We always recommend that a prosthesis in the distal area ends on minimum two implants, avoiding a single implant support.

For this, we present a clinical case in which the first molar was extracted, the therapeutic option is the insertion of two implants with a diameter of 3.4 mm provided that the remaining space width is 14 mm (figures no. 1,2,3,4,5,6,7).

**Figure no. 1. OPT preoperative examination**



**Figure no. 2. Neoalveolus drilling**



**Figure no. 3. Applying parallel pins**



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**Figure no. 4. Implants inserted with augmentation**



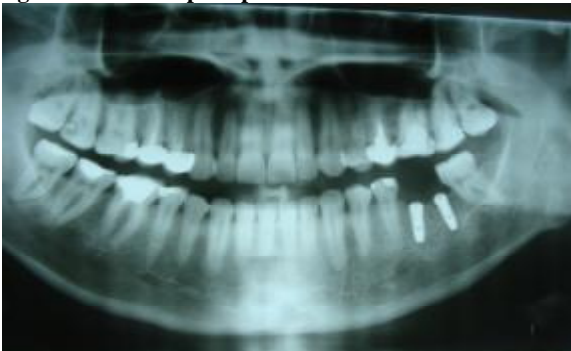
**Figure no. 5. Application of resorbable membrane**



**Figure no. 6. Suturing the wound**



**Figure no. 7. OPT postoperative examination**



Recommendations for modelling molar crown on the implant:

- narrow the bucco-lingual occlusal surface in order to reduce occlusal loads vertically received;
- maintain cusps and mitigate the occlusal surface edges to reduce the occlusal stress coming from horizontal movements;

- we recommend fitting molar crowns in infraocclusion to patients with parafunctions;
- fitting out of the occlusion to prevent occlusal overload during propulsion and laterality movements.

### **Conclusions:**

Of course, over time, practitioners have been attempting to implement some criteria to facilitate the optimal decision-making concerning the implant-prosthetic treatment for a particular given case. Such a decision will be made, of course, by mutual agreement with the patient, according to his wishes and financial possibilities, after a careful investigation of the morphological and functional peculiarities of the case.

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