

BIOMECHANICAL ASPECTS OF IMPRESSIONS IN PARTIALLY EDENTULOUS

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ABSTRACT

Aim of the study The aim of this study is to identify a crucial stage of treatment or functional fingerprint, quantify the factors underlying the choice of method of fingerprinting, according to the particularity of the prosthetic field, to ensure an optimal management of the removable prosthetic therapy. **Material and methods** Within the partially stretched edentulous several methods of functional fingerprinting were described, different from total edentulous, usually using certain criteria: edentulous class I, II, III, IV, Kennedy, V, VI, Kennedy Applegate, supporting prosthetic field muco-bone with high or low resilience; edentulous ridge with sharp or stationary resorption; type of prosthesis, type of occlusion - no contacts of dental decay, the presence of unstable dental decay, presence of a stable dental impression. **Results** Particularities of the prosthetic field clinic-biological related to indices that characterize the odonto periodontal status and the muco-bone, are those that dictate the type of material chosen, the footprint viscosity imprint material or chosen technique. **Conclusions** : Functional fingerprinting is a very important clinical stage with a profound impact in producing the final prosthetic

Key words: functional impressions, biomechanical behaviour, edentulous

Introduction

Partially edentulous, be it reduced or extended, can have an evolution towards the compensation and restoration of the homeostasis of stomatognathic system to a new situation or to quickly or progressive installing of dishomeostasis without any possibility of recovering[1,2,3].

The own compensatory mechanisms are obvious: at the low abrasion dental support (most often, at the front outstanding group, the incision edges take turns into surfaces that have a masticatory function), deposits of cement, more numerous desmodontal fibers, thickened lamina dura. A thickened gingival epithelial sleeve is found at the periodontal support.

At the edentulous bone crest level the bony trabeculations are organized parallel to the ridge edge, they are well organized and there is a continuous cortical bone[4,5,6].

At this stage of edentulous any fixed or mobile type of prosthetic properly solved can stop the evolution of edentulous[7,8,9].

The wider the extent of edentulous is, the quicker the occurring of decompensation mechanisms. In elderly patients with poor general state and a deficient metabolism, the decompensation occurs in supporting teeth tissue with consistent increase mobility, a widening of the space, the congestion of the epithelial periodontal sleeve, the disappearance of lamina dura. These phenomena are favored by edentulous itself, abolishing the contact point and drives the changing position of teeth, acting as in "domino" and hastening the progress towards total edentulous[10,11,12].

In the absence of adequate stimuli, the alveolar bone undergoes a phenomenon of atrophy and slow resorption, the lining covering and underlying bone with being directly involved in mastication. During this series of events the occlusal trauma overlaps, acting most often slowly following the appearance of a slow dental migration.

The known statistical data indicate multiple possibilities of loss of teeth, but teeth extracted last are the mandibular anterior

ones. Langer and Michman found that the survival rate of mandibular canines is four times higher than in other teeth, followed by mandibular incisors, premolars and molars[13].

For most of the time, symmetrical teeth are kept. Maxillary teeth are kept 50% less, but the outcome is similar.

The statistics Clinical base of Faculty of Dentistry in Iasi come to confirm the above mentioned, there is a direct proportion among age, sex, general state and the edentulous condition.

Kelly revealed that over 25% of cases of prosthetic treatment of total edentulous maxilla opposes a partial biterminal edentulous jaw. In the absence of prosthetic treatment occurs the so-called "combined/mixed syndrome" by: extrusion of remaining front teeth, dissolution of the "fan", resorption of the muco-bone support in the distal mandibular and maxillary overgrowth of tuberosity, bunoid papilla hiperplasia and the resorption of the front bone edentulous ridge through a direct trauma.

Speaking about the development in edentulous, let us not forget the interarch link established by occlusion. They found that a common accelerate manifestation of occlusal edentulous state of infancy, from the first tooth extraction: dental migrations, vertical and horizontal curves which drive to changes in sagittal and transverse cusp support and the emergence of premature contacts and occlusal interferences.

The purpose of the study

The many clinical cases requiring treatment make it impossible the removable classification treatment methods depending on the state of edentulous. What can be deduced from a thorough clinical examination is the edentulous extent, the degree of compensation to the dental holder, periodontal bone and mucous and an occlusion maintaining a stable relationship. The aim of this study is to identify a crucial stage of treatment or functional fingerprint, quantify the factors underlying the choice of method of fingerprinting, according to the particularity of the prosthetic field, to ensure

an optimal management of the removable prosthetic therapy.

Material and method

Within the partially stretched edentulous several methods of functional impressions were described, different from total edentulous, usually using certain criteria:

1) edentulous class I, II, III, IV, Kennedy, V, VI, Kennedy Applegate

2) supporting prosthetic field muco-bone with high or low resilience; edentulous ridge with sharp or stationary resorption;

3) type of prosthesis for which the fingerprinting is done:

1) mobile partial prosthesis

2) unimaxilar mixt prosthesis

3) composite prosthesis

4) The outcome in all the remaining teeth or when unprepared teeth are stored

5) type of occlusion - no contacts of dental decay

- The presence of unstable dental decay
presence of a stabile dental impression

The known functional techniques are used according to the above criteria:

1. Functional impression by double mixture technique

2. Functional impression by wash-technique

3. Functional impression with complete individual port fingerprint

4. Final fingerprint final with a cut vestibular port fingerprint (Gysi, Osborne and Lamm)

5. Final fingerprint with an incisal cut port fingerprint (Greenfield)

6. Functional fingerprint with a corrected pattern (Applegate, Holmes)

7. Final fingerprint with a cut dental port fingerprint

This is a 2-stroke fingerprinting technique proposed by Hindels and Rouot and it requires two port fingerprints.

The first is an individual port impression chopped/cut at the teeth level and fitted with pressure cufflinks on saddles.

The second is a standard port impression provided with push-button holes towards the pressure cufflinks of the first port fingerprint. The first fingerprint records

with Z.O.E. and the second with alginic material. It is recommended as a fingerprint compression for harsh prosthetic fields, regular and unretentive.

The method for preparation of organic substructures can streamline the prosthetic treatment by a mixt prosthesis.

We detailed the issues addressed to different types of functional fingerprinting in accordance with the peculiarities of the clinical cases.

Results

Clinical case 1

The following diagnosis was formulated after clinical and laboratory diagnosis:

Diagnosis status: good (favorable for the treatment)

■ periodontal diagnosis: chronic perfacial periodontitis localized in the frontal mandibular group level, of bacterial etiology, involving functional disorders, involving masticatory, esthetic, swallowing, slow evolution, local complications (bone resorption and atrophy), loco-regional good prognosis with treatment, untreated.

Maxillary partially stretched edentulous, Kennedy class I, subclass A Lejoux, etiology caries and periodontal disorders in masticatory function, phonetics, swallowing physiognomy, slowly evolving with local complications, loco-regional, favorable prognosis with treatment, incorrect treated

Edentulous partial mandibular Kennedy class I subclass a Lejoux etiology caries and periodontal disorders masticatory function, phonetic, swallowing physiognomy, slowly evolving with complications local, loco-regional favorable prognosis with treatment, diagnosis incorrect occlusal treated

Occlusal diagnosis malocclusion caused by changing the parameters of static and dynamic occlusion, following the edentulous.

Excentric mandibulo-cranial malrelation/wrong relation, consecutive to edentulous, produced by the anterior-posterior tilt with masticatory functions disorder, esthetic, phonetic and swallowing, slow evolution locally complicated, loco-

regional and general good prognosis with treatment, untreated.

Clinically manifested dishomeostasy, cavities etiology, periodontal and edentulous, chewing disorders, phonetic, swallowing, physiognomy, slowly evolving with local complications, general loco-regional favorable prognosis with treatment, untreated.

Unsatisfactory oral hygiene status, tartar deposits in all odonto-periodontal units, untreated (Fig.1).



Fig.1 The initial aspect of the clinic case

The appearance of the clinical-biological indices provides positive aspects of the muco-bone support and negative aspects of the odonto-periodontal support, due to the marginal superficial periodontitis.

The chosen therapeutic solution was represented by provisional acrylic prosthesis, in order to reposition correctly the cranio-mandible.

The therapeutic algorithm viewed the following steps;

1. The preliminary impressions registered with alginat.
2. Making the functional cast
3. Technological achieving of individual port impressions in full compliance with the used technique.
4. The functional fingerprint

Our option, after the evaluation parameters that characterize the prosthetic area for functional fingerprinting with incisal cut port fingerprint.

The functional fingerprint with incisal cut port fingerprint was proposed by Rapuano.

Firstly, the individual port fingerprint was adapted, subsequently they were imprinted with silicone material using a syringe, silicon material was introduced through the opening

incision, covering the the peridental space(Fig.2).



Fig.2 Aspects of technological achievement of impressions

It can also be used the functional footprint with cut incision port fingerprint, variant described by Greenfield: This method is similar to the prior technique only the alginate is applied onto the entire occlusal surface of port fingerprint with the purpose of instant registration relationship occlusion. In the alginic material, a wire is placed to facilitate the removal of the impression.

For the lower jaw we chose the final impression with vestibular cut port fingerprint.

Gyssi initiated it and Osborne and Lammie resumed. This technique uses a port fingerprint covering the entire edentulous ridges, the incisal edge before the oral and remaining teeth, leaving the labial uncovered.

A first step was represented by static and dynamic verification of the -port fingerprint, the next stage was registering the fingerprint, using the fingerprint silicones. The next step was accomplishing a vestibular key from siliconic material.

Clinical aspects of vestibular functional mandibulo-cranial cut fingerprint registration

Mandibulo-cranial relationships recording using occlusal models

The next representative clinical case for the issue taken into account is represented by a patient with the following diagnosis:

Diagnosis for the general condition: favorable overall status for the treatment

Diagnosis of the local state:

Diagnosis for the integrity of the arch:

Partial edentulous jaw, Kennedy class III with 2 changes and reduced partially edentulous jaw Kennedy class I with 2 changes after extraction (caries disease complications) , with impairment of mastication, swallowing, phonetics and physiognomy, slowly unfolding with the loco-regional and local complications, good prognosis with treatment, untreated.

Temporo-mandibular joint integrity diagnosis: bilateral joint dysfunction, concerned local and loco-regional, affecting masticatory function with left lateral deviation without complications, prognosis, reserved diagnosis, untreated.

Diagnosis for the state of a wrong hygiene After pre-prosthetic treatment steps (extractions of teeth: 1.8, 2.2) and pro - prosthetic, the treatment algorithm involving the following steps:

The therapeutic fixed maxillar solution proposed was acrylic partial movable flexible denture.

The following therapeutic algorithm was chosen:

Preliminary functional fingerprinting and achieving the functional model

1. The functional maxillar fingerprinting.

In accordance with the particularities of the case we chose the technique of functional impressions we chose the technique of functional fingerprinting

It is a 2-stroke fingerprinting technique and requires two port fingerprints.

The first is an individual port fingerprint chopped/cut and fitted on teeth and having cufflinks for pressure on saddles(Fig.3).



Fig 3.aspect of final impression

The second is a standard port fingerprint provided with push-button holes of the first port fingerprint.

1. Firstly the fingerprinting is done by functionalizing the periphery of the prosthetic field using Herbst tests
2. In the second time the prosthetic field fingerprint is performed using individual cut imprint and dental fluid silicone material
3. Mandibular functional fingerprinting
4. Recording of the mandibulo-cranial relationships using the occlusion models
5. Teeth wax models checked extra and intra oral static and dynamic
6. The completion of the removable gnatho prosthetic appliances

Conclusions

1. Functional fingerprinting is a very important clinical stage with a profound impact in producing the final prosthetic

2. Fingerprinting functional accuracy depends directly on the technique used, and the type of material, from this point of view stand the practical terms, the results that are obtained by using sectioned model, adapted to the particularities of the prosthetic field related to their muco-bone and dental periodontal support status.

3. Particularities of the prosthetic field clinic-biological related to indices that characterize the odonto periodontal status and the muco-bone, are those that dictate the type of material chosen, the footprint viscosity imprint material or chosen technique.

4. Modern fingerprinting techniques are designed to shorten the time allowed for this phase of prosthetic treatment, but at the same time they are more reliable than the classic technique with full port fingerprint, separately recording the odonto periodontal support and the muco-bone one.

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