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INSTRUMENTAL FUNCTIONAL ANALYSIS FOR DIAGNOSIS AND PLANNING IMPLANT TREATMENT

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1) BACKGROUND

Research in surface and connection technology in implantology has brought clinical success, saving both the bone level and predictability of the integration of dental implants. However, prosthetic programming is often based on an empiric evaluation where the prosthetic space distribution is not backed by a functional analysis. Radiographs do not give enough information for the comprehensive analysis involved in rehabilitation. In a complete diagnostic evaluation, cephalometric and condylographic analysis are needed to interpret the determinant factors of the damage, as well as to see the new arches and occlusal relation that will reduce the risk factors for implant integration and prosthetic functional overload.

2) MATERIALS AND METHODS

All cases that need rehabilitation follow the same protocol. In addition, other parameters such as the height of the lower face, the vertical dimension of occlusion, the inclination of the occlusal plane and the teeth disocclusion angle are evaluated. Functional analysis includes:

1

Condylographic examination to document the tmj dynamics together with the inclination of the condylar eminences.

2

Cephalometric analysis to measure the height of the lower face and the inclination of the occlusal plane, to clarify the correlation between the inclination of the anterior functional guidance and the inclination of the temporo-mandibular joints as recorded by condylography. This correlation will give the disocclusion angle of the cusps which is an essential parameter in diagnosis and will further aid the dental technician.

3

Clinical evaluation of the ligaments and muscles of the cranial, cervical and mandibular regions in order to identify the muscular vectors and the compensation mechanism.

4

Study casts of dental arches mounted on an individual articulator (reference sl), registered on patient's data from the condylography record for, functional extraoral analysis of the masticatory system.

5

Diagnostic wax-up after programming the ideal prosthetic treatment report.

The diagnostic wax-up serves for a functional verification of the efficacy of the therapeutic hypothesis. It expresses the symbiosis between clinical analysis and the rehabilitation plan, where the clinician and the technician examine the final aim of the implant, before actually starting, as no further orthodontic work can be done later.

6

Surgical template from the wax-up for radiological evaluation.

3) RESULTS

This information helps to analyze the causes of the malocclusion, and to modify the bio mechanics of the system: cephalometry analyzes and modifies through the Visual Treatment Objectives the vertical dimension of occlusion and evaluates the compensation mechanism of malocclusion. The masticatory efficiency and interferences in functional movement will be governed by the teeth disocclusion angle, as well as the relative occlusal plane inclination.

4) DISCUSSION

Today's high level of technology in implantology especially in surface coatings, and guided surgery for predictable success, lacks the same level of evidence-based emphasis on analysis of the biomechanics of the system where the implants will be placed.

Occlusion principles enable to plan the ideal fixture positioning in a functional relation in order to avoid trauma due to unfavorable biomechanics.

The diagnostic waxing-up is done not only for the prosthetic space distribution, but to modify the functional patterns of the masticatory apparatus. It is a useful tool for the surgeon and for all the other specialists involved, to improve the masticatory organ and crano-cervico-mandibular system function in a comprehensive full-mouth rehabilitation.

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