

ABSTRACT

This book consists of my professional development, scientific and academic post doctorate thesis.

As a teacher, i went through all the stages from preparatory to professor. Simultaneously I was involved in several research groups, resulting in a number of 5 books, 38 articles ISI / BDI, six research and development projects, as project manager, expert or long term member. Sustained efforts and work within the academic community administratively culminated with the position of Dean of the Dental Medicine Faculty.

During this period several research lines have been outlined.

In oral rehabilitation (RO) by conventional or implant supported dentures there might be a need for bone augmentation, a necessity that occurs in diseases in the oro-maxillo-facial surgery field (OMF). Implant insertion requires an acceptable volume of bone, whence bone augmentation is the current theme. Research findings have suggested that the use of biological substitutes stimulates the formation of new bone calcification producing organic matrix. The therapy for maxillary bone defects in the aesthetic areas imposes a specific font. Studies have shown that vertical and horizontal resorption rate can vary greatly after extraction. Bone augmentation solutions vary between the defect and the prosthetic mask. Sometimes anatomical and morphological conditions of the defect do not allow efficient additions, cases in which prosthetic masking is a successful solution.

The amplitude of the post tumoral defects depends on the tumor size and histopathological appearance. OR is necessary for the restoration of homeostasis of the organism. There are alternatives that enhance postoperative quality of life by using

magnets or implants. The prognosis depends on the precocity of the diagnosis of these diseases and is generally reserved.

Chemical and biochemical principles, applied in order to process cytological specimens must be adapted to the particular anatomical tissue. Technical processing of bone material requires a mandatory stage: decalcification. Studies suggest that for the same tissue size, solution and concentration, the samples decalcified differently depending on the time span. The quality of fixing depends on physical factors and tissue type. Immunohistochemistry results may be influenced by the type of descaling agent and the time of immersion.

Designing an ideal edentulous ridge/jaw, which can be then compared with the actual one obtained after 3D reconstruction is useful in studying the behavior of real bone under masticatory forces and FEM analysis can forecast the production of bone atrophy. Mandibular reconstruction is difficult, being a bone cell, looking to suit the base.

Jaw biomechanics, which is complex and must withstand the forces and stresses during functionality, is subject to deformation due to the forces exercised. Stress and its distribution depends on the nature of the forces, the quality of bone material and its geometry. In order to optimize form, we must obtain a parametric model, with no anatomical detail, the geometry being optimized by genetic algorithms. It has been demonstrated that the simplified model can approximate the real mandibular body in the lateral areas. The ridge is affected by the tensions produced by bone angulation and loading forces.

FEM analysis is useful in the prognosis of maneuvers already made. In mandibular fractures at the restoration point, the fracture is sensitive, susceptible to the forces exerted on the bone, which adds to the force of the screws and of the osteosynthesis plate. Even if occlusion and chewing cause significant efforts on the osteosynthesis plates, which bear burdens, and the bone during healing is not subject to excessive mechanical loads.

Evaluation of the biomechanical response during the application of orthodontic forces to adult patients with bone resorption can be achieved by FEM analysis at bone level.

Edentulous as a pathophysiological condition, has a profound impact on the quality of life. It is consequential to changes at biological, physiological, and aesthetic levels that have direct influence on the patient's psyche. Fear of pain during or after treatment negatively influences the patient. Knowledge of these factors and their interrelations can guide the physician to therapeutic success.

Acceptance and integration of future psycho-cortical prosthetic parts is dependent on the existence of a direct link between what the patient expects from the treatment and what the medical-dental technician team can offer.

Fear of the dentist appears regardless of age, most likely at a young age. Their experience in early childhood at the doctor's office influences adult behavior and thus decide its dental problems. Using a variety of questionnaires for historical typology the best solution and patient care can be suggested.

Interventions in the OMF field generate negative emotional states, which oscillate between the functional and the disfunctional and between anxiety, fear or phobia. These conditions make it difficult to conduct a medical act and can lead to complications or medical emergencies.

Findings of the human body as a single complex of biosystems which are interrelated to each other to maintain homeostasis, is the approach that we should have when we deal with a complex of various clinical situations in OR.

The doctor and patient should go through a logical sequence of diagnosis and treatment together, throughout the rehabilitation process, with an interdisciplinary nature in dentistry, linked and integrated with those concerning the overall health of the body.

Future teaching and administrative development have the following objectives:

- A Simulation Center in Dental Medicine
- Education and training of competitive graduates
- Interdisciplinary Collaboration

- The idea behind interdisciplinarity emerged more than a decade ago and I think that I should expand my area of interest, which can generate pertinent and topical future PhD research topics.
- The main directions of development and the proposed research are:
- FEM analysis of the bone support of the prosthetic field
- Streamlining implant prosthetic treatment using specialized software and surgical guides
- Removable denture wearers satisfaction survey
- The management of patients with needs of complex oral rehabilitation in terms of cost benefits.

Another goal is to attract young doctors, residents or students in research groups on the proposed themes.