

masticatory and phonatory function; nevertheless, a pleasant aesthetic is important, so as to also allow psycho-social reintegration. This is not always possible with mobile prostheses, due to the healing of tissues after cancer surgery and because of supportive therapies, such as radiotherapy. Likewise, the uncooperative patient is often not inclined to the long sessions necessary to make the prosthesis; moreover, mobile prostheses are often not tolerated, and the disabled patient ends up not using them. Computerized surgery allows to create a prosthesis according to a virtual prosthetic project (Digital Workflow), minimizing morbidity and complications related to the insertion of implants. It also proves to be a valuable aid in prosthetic rehabilitation of post cancer patients who have undergone invasive surgery in the cervico-facial area, where it is difficult to make adequate mobile prostheses. Finally, this method facilitates and considerably reduces the number of surgical-prosthetic sessions in uncooperative disabled patients.

### Bite force measurement devices

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**Aim:** Bite force is an indicator of proper functioning of anatomical structures composing the masticatory system. Interest in the study of this force began more than 300 years ago, when Borelli first decided to obtain an evaluation of masticatory system using a device called Gnathodynamometer. Historically, G.V. Black built the first intraoral devices to measure bite force and they consisted of a lever, a spring and a manometer, or splints places over the teeth with a steel stud impinges. Different devices are now available to measure the bite force; they allow to analyze and prevent dysfunctions of masticatory system. The purpose of this study is to review new devices providing some important indications for clinicians.

**Methods:** This review was identified through electronic databases such as PUBMED and Research Gate. The articles were written in a period between 1968 and 2020 and evaluated by titles, abstracts and full texts.

**Results:** Several devices recording bite force are able to evaluate masticatory efficiency and its implication in therapeutic effectiveness. Studies about masticatory system are now oriented to new devices, less expensive, easier to use and fitted out with electronic components; the latest ones can record up to 1000 N and thanks to different types of sensors they are able to convert bite force

into a series of detectable and recordable data. The most widely used and modern devices are based on force transducers (also known as load cells) which convert force into electrical energy; this is made possible by piezoelectricity, pressure and strain of composing material. Piezoelectric transducers use piezoelectricity to convert mechanical stresses exerted on the surface of crystalline materials into electrical charges. These kinds of transducers can be useful in subjects with reduced jaw opening. Strain gauge transducers emit a proportional electrical potential depending on the deformation induced in metal plates or forks; this transduction could be useful in edentulous patients, where lacking teeth make difficult to record in maximal intercuspal occlusion. Pressure transducers generate a signal generated by the pressure exerted in a chamber containing fluid or air. Moreover, a novel in vivo methodology using an optical fiber-based Bite force measurement device (BFMD) converts the variations of a metal plate - induced by the force exerted on the occlusal surfaces - using an optical fiber sensor called fiber Bragg grating (FBG). Another system uses a wireless connection to share informations from a splinted passive force sensor to an active external unit. Bite force influencing factors are previous prosthetic or orthodontic treatments, coexisting malocclusions, current periodontal health of teeth, the age, the gender, craniofacial form, detection site along the dental arch and the number of teeth; all these variables have been studied in clinical research not only to intercept symptoms or predisposing factors for temporomandibular joint dysfunction (TMD) - paradigm of the multifactorial disease - but also to monitor variation in bite force across a prosthetic treatment and to analyze differences between patients with normal occlusion and patients with Angle's malocclusion.

**Conclusion:** By analyzing influencing factors on measurement of bite force, it is possible to provide some important indications for clinician about detection methods (and bite force recording devices), with both the aims of early diagnosis of masticatory dysfunctions and evaluation of treatment efficacy.

### Incidental findings detected through CBCT in the orofacial district: prevalence in a prospective cohort of 3432 patients

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**Aim:** Incidental findings are previously undiagnosed