

## Baltic Denture System: Analog meets Digital





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## About the Authors

**Dr. Christian Barbieri** graduated from Dentistry and Dental Prosthetics at the University of Studies of Milan. He earned a Master's Degree in Occlusion and Removable Prostheses and Gnathology from the University of Siena and attended various specialization courses, acquired higher education and updates on the subject of removable prostheses at the Universities of Milan, Bologna, Siena and Zurich. Since 2010 he has been coordinating the Department of Mobile Prostheses and Maxillofacial Rehabilitation at the University Dental Clinic of the San Paolo Hospital in Milan. Since 2019, he has acted as Professor Under Contract at the Degree Course in Dentistry and Dental Prostheses at the University of Studies in Milan. He works as a freelancer and carries out the activity of Specialist Consultant on complex prosthetic rehabilitation. He is author and reviewer of scientific publications for Italian magazines specializing in prosthetics, and is involved in training and speaking for companies and cultural associations of the sector on the theme of geroprostheses. He is the Italian speaker for Candulor and clinical consultant for Baltic Denture System.

**Odt. Enzo Cesaretti** graduated in 1985 and began to deal with removable prostheses and construction of orthodontic appliances. He participated in various training courses deepening his understanding of orthodontic methods and techniques. In 2000, he attended a refresher course on Functional Therapy and on the dysfunctions of the TMJ according to the philosophy of Prof. Roth. In 2005 he became a founding partner of Ergodent in Abbiategrasso, Milan. Since 2008, he has been taking practical courses with Merz Dental Trainers nationwide. Together, with other colleagues he founded Digital DENTAL Network for training, consulting and production of the Baltic Venture System, Merz DENTAL (Total Digital Prosthesis). In 2017 he was a founding member of Aservice Technology dealing with Dental Aesthetics in Invisible Orthodontics. In 2018, Ergodent became All Dental Technology in Abbiategrasso Milan, developing dental products using a total digital path. In 2020, he was a speaker for Merz Dental Campus on the topic of "BDS, Total Digital Prosthesis"

uman health is a condition resulting from a multifactorial equilibrium. Environmental factors, genetics, lifestyles, physiological, pathological and psychological factors combine to determine what we define as the state of health. In this general scenario, the health of the stomatognathic system plays an important role because it must be considered as a condition involved in vitality, emotions and functions which can have a strong influence on the quality of life. The edentulous stomatognathic complex, on a global scale has a high prevalence, particularly in the population over 65. In 1990, the World Health Organization defined edentulism as a pathology, or rather, a chronic disabling condition that, although not directly correlatable for causality to pathologies or systemic disease in general, is considered the cause of severe psychological and pathophysiological involution of the residual structures of the stomatognathic system, not that of possible serious repercussions on psycho-emotional and relational sphere. These assessments have been studied in some systematic reviews of literature to evaluate the comorbidity of total edentulism and confirmed the lack of causal links with systemic diseases but an increase in risk of exposure to certain factors, the main ones being malnutrition, obesity, arteriosclerosis.

In the current socio-cultural, economic and media context, a discrepancy emerges between that which is on the one hand, increasingly relevant to the need to conform to aesthetic models and image recognized as adequate and on the other hand, the presence of one social segment increasingly greater than people who have economic barriers to approaching specialist dental care. The removable prosthesis in a broad sense and the complete prosthesis in particular, are always first level of rehabilitative care, they assume so and they return to take on a role more and more current to satisfy the needs of the market: simplicity, non-invasiveness, low cost, reversibility, rational, and planning for sophisticated rehabilitations - all aspects introduced by Gentle Dentistry (European College of Gerontology 1995). The search to satisfy market demands, time and cost containment, has been oriented over the years to the creation of MAPs Minimum Acceptable Protocols (Owen 2006) in complete dentures. Once they were key to access at the last frontier of the complete prosthesis, the new digital complete prosthesis discipline brings with it a series of difficulties and stimuli for research that is, to exemplify the complexity of creating a true flow of completely digital work by integrating and simplifying the steps from analog to the chair, maintaining low costs, times and adequate quality.

In this general context, the Baltic Denture Protocol System by Merz Dental, has been examined in some experimental studies at the University of Milan in order to compare variables such as: steps, time, cost, construction quality and satisfaction with respect to protocols and traditional activities in use at the Dental Clinic of the San Paolo Hospital.

## Baltic Denture System uses: BDCreator<sup>®</sup> PLUS CAD-software, BDKEY<sup>®</sup> Set, BDLoad<sup>®</sup>

In the presentation of the following case is an example of a possible application of the BDS system in relation to the rehabilitation of a post-extractive single upper arch and where possible, evaluate some of the possible implementations achievable thanks to:

## BDCreator<sup>®</sup> PLUS CAD-software e to 3D printing

Patient M. E. male, 1960s in good general health, presented with a lower cast framework prosthesis with clasps and open to total remediation for about two weeks. An optical impression of the two arches is acquired by intraoral scanner (Medit 500), a procedure that, compared to traditional techniques, obtains a completely passive reproduction of the prosthetic support area, improving the reality of the model in this virtual case but still retains the tissue adaptation limit of the peripheral joint, which in this case you decide to get by means of a second semi-functional impression. The STL file then comes loaded on BDCreator<sup>®</sup> PLUS (Figs. from 1a to 1h).





At this point the clinician and the technician, thanks to the help of 3D printing, can opt for the realization of: an individual upper tray, a static registration base or a dynamic registration base.

In the case in question, a second impression is obtained using a basis of static registration printed which will be adapted to the Wax System Spacer<sup>®</sup> (chewing wax with compression resistant insert) (Fig. 2a and 2b).

The printed registration base (resin for M-PRINT 3D printers Merz Dental) prepared for the Wax Spacer System is first checked with silicone materials to eliminate any overextensions, then edged with Iso Functional, GC according to the classical method in order to obtain an adaptation of the peripheral tissue joint, in function with the evaluation of the vertical dimension. One of the three models is chosen for the Wax Spacer<sup>®</sup>, transforming the individual impression tray into a sort of base plate with wax. In this case no modeling of the vestibular support is required as we are able to refer to the lower arch and to the mean values with respect to the upper retro-incisor papilla (Figs. from 3a - 3f).

Once the edging has been done, continue to the choice and adaptation of the wax insert for the determination of the vertical height by means of traditional methods used with the double wall system in wax (Silverman equation and research free interocclusal space, evaluation of aesthetic criteria, absence





















































of phonetic contacts); then you move on to registration of horizontal and midline aesthetics; after cooling of the indented Wax Spacer<sup>®</sup> wall, switch to taking the fingerprint final with polysulphides, with the closed mouth method to reduce possible occlusal problems.

The last data to be collected in this phase is the choice of tooth for size, shape and color, a procedure that can be done in various ways, in our case through the projection of the nasal wings on the vallo in wax and / or the measurement of the width of the nasal base.

At this point, thanks to the BDCreator® PLUS it is possible to choose whether to proceed with the finalization of the work using the most appropriate BD Load in reference to the measurements taken by the clinician and any photographs related to the laboratory, or it is possible to 3D print a single-color prototype to test aesthetics and function for any corrections (vertical, centric, teeth) (Figs. 4a and 4d).

Once the functional congruity has been confirmed and the patient's approval has been obtained for aesthetics, we proceed with the final milling of the BDLoad® (Figs. 5a to 7e).