tension until failure with a simplified universal testing machine at a crosshead speed of 1 mm/min (micro-tensile bond test).
Results: For all the adhesives, the electrobonding technique revealed an increase of the impedance values compared with the standard method application for both self-etch and etch and rinse adhesives. However, the extent of the increment is not the same for all the polymers under test; some seems to have better performances than others. Adhesives have also shown a significant increase in resistance to shear forces; finally, the micro-tensile bond strength test revealed significantly higher bond strengths compared to controls for the adhesive system when it was bonded under effects of direct current.
Conclusion: Therefore, with the aim to investigate the effects of the current flow on the enamel-dentinal adhesives applications, a protocol to compare the standard technique application versus the electro-bonding technique is defined. Finally, the results of this comparative study are shown and final considerations of further implications and future developments are investigated

Accuracy of three elastomeric impression materials: an in vitro study

Malvezzi V., Langiano L., Gizzi A., Bernardi S., Di Pasquale R., Petrelli P., Varvara G.

Department of Medical, Oral and Biotechnological Sciences, University "G. D'Annunzio" of Chieti-Pescara, Chieti, Italy

Aim: Dimensional accuracy when making impressions is crucial to the quality of fixed prosthodontic treatment, and the impression material is a critical factor affecting this accuracy. The goal of an impression is to provide a void-free negative representation of a prepared tooth, which will produce an accurate cast of the prepared tooth and the surrounding tissue. The aim of this in vitro study was to assess the reproduction accuracy of the surface details of dental impressions made with vinyl-siloxanether and compare the accuracy to a traditional vinyl-polysiloxane and a polyether impression materials.
Methods: A stainless-steel model with two abutments preparations was fabricated and impressions were made 10 times for each of these materials, which gave 20 abutments impressions for each group. All the impressions were made with a 2-phase, 1-step technique (heavy-body/light-body), using a perforated stock tray for vinyl-siloxanether and vinyl-polisiloxan and a not-perforated stock tray for polyether. After the removal of all of these impressions, an examiner counted the number of open voids (approximately 2 to 4 mm) and bubble-like enclosed voids (< 2 mm) visible on the surface to the naked eye at a working distance of approximately 150 mm. Only the defects in the area of the preparated abutments were included in the assessment. The number of defects on each specimen were ranked as follows: type 0 (no defects), type 1 (1 or 2 enclosed voids), type 2 (> 2 enclosed voids) and type 3 (presence of open voids). In order to evaluate the differences between the frequency of the defects in the considered materials, the not-parametric data were analyzed using Fisher exact test on contingency tables. To explore any significance between the type of defect, ANOVA test was performed. The obtained results were considered significant setting a p value < 0.05.
Results: The frequency of defects ranged from 95% of the impressions in the vinyl-siloxanether and vinyl-polysiloxane groups to 30% with the polyether impressions materials. The most frequent type of defect found with vinyl-siloxanether and vinyl-polysiloxane impression materials was type 3, while the most frequent type of defect found with polyether impression material was type 1. No statistical differences were seeen between the impression materials, although there were numerically fewer impressions with defects with the polyether. The polyether impression material had the greatest accuracy, with fewer defects than with either of the impression materials.
Conclusions: Polyether material showed better accuracy of the reproduction of surface details of dental impressions compared to vinyl-polysiloxane and vinyl-siloxanether impression materials, although the other two impression materials also constitute a valid alternative for making a precision impression..

3D printing review: innovative devices for dental applications and digital dentistry

Mastroieni R., Fiorillo L., Stumpo C., Amoroso G., Gambino D., Scoglio C., Cervino G., Cicciù M.

Università degli Studi di Messina

Aim: 3D printing is increasingly used by dentists and dental labs as a complement of existing dental fabrication tools. Several different applications of 3D printing have been developed. Uses of 3D printing include the production of drill guides for dental implants, the production of physical models for prosthodontics, orthodontics and surgery, the manufacture of dental, craniomaxillofacial and orthopaedic implants, and the fabrication of copings and frameworks for implant and dental restorations. This paper reviews 3D printing various applications in dentistry and in maxillofacial surgery. The DSD Planning Centre has been a pioneer in using 3D printed technology for the benefit of dentistry, by assisting

dentists in the planning of their patient's treatments. DSD started years ago, with the creation of 3D printed digital models that represent the desired future state of the patient's teeth after complete dental treatment. 3D digital impression can be taken with an intra-oral scanner, a camera that can create a 3D rendering of the teeth and gums in a digital file.
Methods: A comprehensive review of the current literature was conducted according to the PRISMA guidelines by accessing the NCBI PubMed database. Authors conducted the search of articles in English language published from 2008 to 2020. The first analysis with filters recorded about 34 manuscript accordingly with the selected keywords. Finally a number of 25 appropiate published papers were comprehended in the review.
Results: this review shows the great capabilities of 3D printing technology in many fields like the following. Digital orthodontics: the most common applications of 3D printing in dentistry are transparent aligners and night guards. Aligners, which serve as alternatives to braces, have become especially popular because of their invisibility. The Invisalign, system digitally realigns the patient's teeth to make a series of 3D printed models for the manufacture of 'aligners', which progressively reposition the teeth over a period of months/years. Crowns: when you break a tooth, the dentist creates a crown to replace the broken part. Surgical Guides: oral surgeries need to be very precise, and dental 3D printing has made precision easy. A 3D printed guide designed to fit perfectly in a patient's mouth is an indispensable asset for a dentist.Models: doctors can print a model of the patient's mouth and verify that their implant, crown or aligner will fit with precision.
Conclusions: While dental 3D printing has already been established as a successful industry, development continues to move forward. New applications are constantly emerging, each hoping to fill a different niche of the industry. 3D imaging and modelling and CAD technologies are hugely impacting on all aspects of dentistry. 3D printing makes it possible to accurately make one-off, complex geometrical forms from digital data, in a variety of materials, locally or in industrial centers. Cost effective, simpler workflow, high-quality parts, short turnarounds, improved patient experience, easing trial and error and the flexibility of accomplishments are the main advantages of 3D printing and 3D scanning for the dental industry. As in all thing, in contrast to the many benefits there are also limitations typical of 3D printing; like: Demand for exact accuracy and precision, skilled training and the dental 3D printer price.

Functional foods: green tea and oral health

Mazur M., Ndokaj A., Bietolini S., Jedlinski M., Capocci M., Corridore D., Nardi G.M., Guerra F., Ottolenghi L.

Sapienza University of Rome, Italy

Aim: The definition of "functional foods" is: "healthful foods or food ingredients that have a potential health benefit beyond their nutrient content when consumed regularly in typical quantities as part of a varied diet". Aim of this study was to evaluate the health-promoting effects of green tea on oral health.
Methods: This review was conducted according to the PRISMA statement. In vivo studies on dentate humans were included without restriction on language and year of publication. Literature searches were performed using MedLine (PubMed), Scholar and Scopus. The following characteristics were collected :study year, type and setting; age, size and recruitment sample; case and control interventions; pre-treatment and co-intervention; vehicle, daily dose and the total dose; consumption frequency and length; wash out period in RCTs with cross-over design; follow-up, drop-out and sample size at follow-up.
Results: Ten studies were included in this review. All the included studies were published in the last ten years. The vehicle products for green tea were: mouth rinse, chewing gum, toothpaste, drinking tea, strips. The Jadad-scale for RCTs evaluated the included studies with high quality. The health-promoting effects of green tea are due to its polyphenol components (catechins). Moreover, the polyphenol concentration in green tea is higher than in black tea, with a greater antioxidant and anti-inflammatory effects, and antibacterial, antiviral, antimutagenic and anti-aging properties.The preventive role of green tea in the development and progression of oral diseases has been shown in chronic periodontitis within effects on periodontopathogens and on host immune reactions.
Conclusion: In conclusion, there is a growing number of clinical trials investigating the use of green tea as an adjunct to the prevention and treatment of oral diseases. Further studies are needed to validate its use in comparison with the standard of care.

SEM evaluation of stainless steel archwire structural modification during orthodontic treatment: an ex-vivo study

Nava P.[1], Matarese M.[2,3], Cicciù M.[1], Imbesi Bellantoni M., Lucchese A.[4-5]

[1]Department of Biomedical, Odontostomatological Sciences and Morphologic and Functional Images, Dental School, University of Messina
[2]Department of Biomedical, Surgical and Dental Sciences, School of Dentistry, University of Milan, Milan, Italy
[3]Fondazione IRCCS Cà Granda, Ospedale Maggiore Policlinico, Milan, Italy