Two approaches and one goal

State-of-the-art CAD/CAM materials are offering clinicians the possibility of producing certain types of restorations in the dental practice using a semi-direct technique. Ceramic veneers, for example, are easy to fabricate in-office with IPS CAD Multi, without the need for glazing.

By Dr. Eduardo Mahn, Chile

Recently developed restorative materials have opened up a myriad of exciting possibilities for dental practitioners. In the restoration of anterior teeth, clinicians have to select the most appropriate material for the case at hand on the basis of specific criteria. In situations where teeth show signs of erosion, abrasion, attrition or a combination of these phenomena, practitioners will tend towards using ceramics or composite resins, depending on how much intact tooth structure remains available. Traditionally, composites are used for Class III, IV and V defects. However, ceramic veneers are preferred in cases where a large amount of tooth structure is missing or a major change is planned (e.g. smile makeover).

The challenge

When two central incisors need esthetic enhancement, the choice of approach is not so clear. Irrespective of the material used a minimally invasive route involving very little preparation of the tooth structure can be taken nowadays due to the high strength of modern materials (e.g. lithium disilicate glass ceramics). Nevertheless, it is important to remember that minimal preparation is an option, only if the teeth are properly aligned. As long as the desired changes of the tooth shape and shade are small, preparation can be limited to the enamel.

In many cases, however, orthodontic treatment is needed before the tooth position and/or shape can be optimized by means of restorative procedures. This minimally invasive approach requires the dental practitioner to convince the patient of the necessity of undergoing preliminary orthodontic treatment.

The solution

It is our aim to remove as little of the tooth structure as possible in every case that we treat. With modern materials such as lithium disilicate or leucite-reinforced ceramics, we can confidently press or mill veneers that are as thin as 0.5 mm and even 0.3 mm. One of the main advantages offered by this type of ceramic is its wide range of applications. Until a few years ago, the treatment with indirect restorations required at least two appointments.

Ceramic materials such as IPS Empress® CAD allow dental practitioners to produce polychromatic monolithic veneers and crowns in less than one hour, without having to glaze them. Nonetheless, many dentists still believe that dental technicians with their well-honed manual skills produce better esthetic results than a machine, and they do not see the need to embrace digital technology. As a result of this point of view and the high acquisition costs of the milling machines some clinicians are reluctant to invest in this technology. On the basis of the present clinical case study we would like to highlight the following aspects: the importance of having the right treatment plan, the possibilities currently available for the fabrication of veneers, the potential of the press and CAD/CAM techniques and the latest improvements made in the field of cementation.

Clinical case

Patient history

A thirty-one-year-old female patient came to our office because she was dissatisfied with her anterior teeth. She complained about the misalignment of the upper and lower central incisors (Fig. 1). A detailed clinical examination revealed that the composite restorations in these teeth were defective. As a result of erosion, a considerable amount of tooth structure had been lost. In addition, the misalignment of tooth 31 and 41 in particular was quite obvious. The treatment plan presented to the patient included initial orthodontic treatment followed by minimal preparation of the two central incisors for two ceramic veneers. The patient was subsequently referred to an orthodontist for treatment. Unfortunately, it took more than a year before she presented to the practice again. At this consultation, we were quite surprised to find that the two central incisors had been restored with poorly finished direct composite veneers (Fig. 2). Many clinicians simply underestimate the challenging nature of this type of restoration, and this was a case in point. In addition to preventing any contamination of the working field, the clinician must also accomplish the arduous task of creating an appropriate emergence profile, proper contours and contact areas and producing a suitable micro and macro-texture, and all this within a single appointment.

The treatment

The composite veneers had to be removed and replaced with new ones. In this particular case, the advantages of using the indirect technique were obvious. The patient agreed to have two ceramic veneers made for her. For this purpose impressions were taken and a master cast was produced. This working model provided the dental technician with the opportunity to evaluate the situation in detail. He or she has the time to think about possible ways of correcting the misalignment.

Dentists do not have this “luxury” of time when they are treating a patient in the dental chair. They have to finish the restorations as quickly as possible in order to prevent contamination of the treatment field and keep chair time to a minimum for the comfort of the patient. In the present case, an additional hurdle had to be overcome. Any composite material that might have remained on the tooth structure had to be clearly identified and carefully removed without damaging the healthy tooth structure. Transillumination with white LED light came in...
Fabrication of the restorations

Two different routes were pursued in the fabrication of the veneers. We instructed our lab technician to make two ceramic veneers using the press technique with IPS e.max® Press (shade HT A1, stained). At the same time, we milled two ceramic veneers with our in-office CAD/CAM machine using an IPS Empress CAD Multi block (shade A1). The veneers made in the dental office were not glazed, just polished Figures 6 and 7 allow the results to be compared from a facial perspective. This experiment illustrates the aesthetic potential of modern ceramics. Both types of restorations blend in beautifully with their surroundings.

Placement

Figures 8 and 9 show the try-in pastes (Variolink Esthetic LC) on the prepared teeth. The most suitable composite cement was determined on the basis of two differently coloured pastes. Two extreme options were compared: Lights+ and Warm+.

The difference was clearly visible when the pastes were applied. Even though the darker shade (Warm+) was very close to that of the natural tooth structure and would have worked well with the veneers, we ended up choosing the lighter shade. This was a typical decision. In most cases, we tend to prefer the lighter version, since it provides a better contrast to the tooth structure and therefore renders the removal of excess cement easier and faster. Before the veneers were seated, retraction cords were placed and the enamel was etched; the dentin remained unetched. Adhese® Universal was used as the bonding agent to place the veneers (Figs 10 and 11). Then the excess luting composite was carefully removed and a glycerine gel (Liquid Strip) was applied (Fig. 12). This gel prevents the formation of an oxygen inhibition layer at the margins. The luting composite was cured with two curing lights (Bluephase® Style) simultaneously and cooled with plenty of water (Fig. 13). Figure 14 shows the harmonious result produced by the lithium disilicate veneers.

Conclusion

State-of-the-art restorative materials have immense potential. Depending on the particular requirements of the patient and the indication, they allow a suitable treatment option to be found quickly and easily. The case presented here shows that highly aesthetic ceramic veneers can be fabricated with minimal effort using in-office equipment (IPS Empress CAD). Nevertheless, pressed ceramic veneers were chosen for this patient, since they offered the possibility of applying stains, through which a very close match to the neighbouring teeth could be attained. In principle, however, highly aesthetic results can be achieved with both approaches if the appropriate treatment protocol is followed. The article was republished with permission of Reflect Magazine.

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Intraoral Device for the treatment of Sleep Apnea

By Dr. Luis Gavin, Spain

Bad sleep is the new hokey pokey, threatening the overstimulated, overworked masses with disease and even an early death. Numerous scientific studies from researchers around the world have demonstrated the harmful effects of sleep deprivation on human health. When stress levels go up, people gain weight and forget things. Without shut-eye, the body doesn’t have a chance to produce enough growth hormones to build itself back up.

Sleep Apnea (SA) is a disorder that causes pauses in breathing during sleep that expose the heart to oxygen deprivation. It is common in patients with heart failure (HF) where it is associated with increased risk of hospitalizations and death.

In the treatment of snoring and sleep-disordered breathing the mandibular repositioning devices are an increasingly important instrument.

Its mechanism is based on the advancement of the mandible, which increases the dimensions of the upper airways and the air flow during sleep. Aim of this study was the investigation of the efficiency during sleep. Aim of this study was the investigation of the efficiency during sleep. It consisted in the obstruction of the airway structures. These respiratory obstructions are accompanied by "snoring" and frequent arousals.

Key Words
OSAS, sleep apnea, snoring, protrusion

Introduction
The OSA Syndrome (obstructive sleep apnea syndrome) is one of the clinical pictures that play an important role in the chronic diseases. It has been demonstrated that a timely diagnosis and an adequate treatment can decrease neurological consequences and have a favorable effect on the cardiovascular health status of affected patients. Clinically it consists in the obstruction of the air flow during sleep that is caused by a partial or total collapse of the upper airway structures. These respiratory obstructions are accompanied by "snoring" and frequent arousals.

Patient have a number of symptoms: daytime sleepiness and fatigue, due to restless sleep, morning headache, loss of intellectual capacities and nighttime micturition. Sleep apnea affects approximately 7% of the adult population, but the problem may be underestimated, due to the growing global prevalence of obesity. For decades the continuous positive airway pressure (CPAP) mask has been the treatment of choice, but its disadvantages, rejection and intolerance on part of the patients complicate the optimization of this new therapeutic way. These systems underwent technological developments in the last years, the treatments of choice for patients who suffer from with snoring and mild or moderate sleep apnea.

Why is important the treatment of snoring and sleep apnea? Importance is based on the following reasons: 1. High prevalence in today’s society, as various studies have demonstrated in the last years. There exists an incidence of 23% for snoring, approximately 49% of adults more frequently and 35% habitually. The prevalence of OSA ranges from 6-8% in males and 4-6% in women among the general adult, middle-aged population and this numbers increase markedly with age. 2. It represents a problem in two aspects, the social that converts these patients in intolerable bed partners and the more serious clinical impact of significant morbidity. These impacts can reach a noise level of about 78-88dB (equal to the noise of a truck at high speed on a highway). The limit for hearing damages is estimated at an intensity of 75 dB. Snoring disrupts social and family relationships of patients. Its psychological pressure influences both lives, the daily routine of people who snore, as well as the every day life of people, who...
suffer from the noisy consequences causing problems in the partnerships.
3. Disordered breathing by sleep is very habitual and, therefore, a constant source of problems regarding health and economic impacts. Poor sleep habits aggravate the impairments of health and quality of life causing countless traffic accidents, lethal accidents and accidental home injuries. The majority of these disorders lead to disabilities in its clinical description, disabling affected patients to drive. In all countries the number of fatal accidents increases constantly. It is the first cause in men aged between 20-49.
4. The access to diagnosis possibilities is the major problem facing the specialists, as about only 6% of the population with relevant OSA is diagnosed. Clinical researchers seek for diagnostic alternatives to the costly polysomnography that is currently the first diagnosis recommendation (6). The OSA is rarely known to the public. The lack of diagnosis is the main medical home to solve. Recent studies show that in only 7% of medical examinations of primary care, explicit references regarding possible sleep disorders are included. This incorrect diagnosis involves fatal consequences because the pathology is ignored by patients that, without being diagnosed, do not know how to justify and cope with the symptoms that they face day by day.
To conclude, school and work absence and the reduced capacity at work also cause economic damages.

Objectives and hypotheses

Hypothesis

Mandibular advancement devices (MADs) are efficient for the treatment of snoring and mild to moderate sleep apnea.

Exclusion Criteria

1. Patients with severe OSAS
2. Patients with rhino-pharyngeal pathology
   - Inappropriately deviated, peri-odontal diseases without treatment
3. Serious problems in the temporomandibular joint (TMJ)
4. Insufficient protrusion capacity

Methods

1. Cardio-respiratory polygraphy
2. Physical examination
3. Dental impressions
4. Appointment for adaptation and user instructions

Procedures

The study and evaluation were performed by the same professional with over 20 years of experience in the mandibular advancement devices. Objective and subjective assessments were performed prior to placement and after one month of treatment. The study subjects had to fill in the Epworth test and undergo the Apnealink after one month of treatment. This test evaluates the quality of life both regarding subjective and objective criteria.

The analyzed variables were: age, sex, MAD type, AHI before and after MAD therapy, index after MAD therapy, Epworth index, the level of satisfaction of the patient and his partner after MAD therapy.

Analytic study

In table 1 the mean values of the reviewed indices before and after using MADs during one month are compared. The comparison of the parameters was taken with the Wilcoxon test, as it is about paired and small quantity data. In table 2 the same analysis for MAD 2 is repeated.

Conclusions

1. With regards to the medical complications of snoring and OSA and the socioeconomic repercussions, there exist long waiting lists in the public health authorities, and thus the public health authorities formulate the specialist to get a better knowledge about it and makes him aware of the importance of its multidisciplinary character including the participation of a dentist that is well experienced in the treatment of OSAS patients through the use of MAD, a treatment alternative with a high patients’ acceptance, because of its low treatment costs and high efficiency being individualised treatment option or in combination with other treatments.
2. It is a good recommendation that the public health authorities formulate a valid preventive dentistry plan, as it was demonstrated that the sleep apnea problem is a sanitary priority of high relevance because the efficiency of mandibular advancement devices for the treatment of snoring and mild to moderate sleep apnea.