Current Dental Research...

Restorative dentistry
Current Dental Research titles are worldwide, Medline-based lists of recently published articles in English, produced by the BDA Library to assist members in identifying the articles needed.

For more information about this service please contact the library.

Our current opening hours are:

Monday – Friday
09:00 - 18:00

Tel: 020 7563 4545 | E-mail: library@bda.org
1. Osman RB, Alharbi N, Wismeijer D. 
Build Angle: Does It Influence the Accuracy of 3D-Printed Dental Restorations Using Digital Light-Processing Technology? 
PURPOSE: The aim of this study was to evaluate the effect of the build orientation/build angle on the dimensional accuracy of full-coverage dental restorations manufactured using digital light-processing technology (DLP-AM). 
MATERIALS AND METHODS: A full dental crown was digitally designed and 3D-printed using DLP-AM. Nine build angles were used: 90, 120, 135, 150, 180, 210, 225, 240, and 270 degrees. The specimens were digitally scanned using a high-resolution optical surface scanner (lScan D104i, Imetric). Dimensional accuracy was evaluated using the digital subtraction technique. The 3D digital files of the scanned printed crowns (test model) were exported in standard tessellation language (STL) format and superimposed on the STL file of the designed crown [reference model] using Geomagic Studio 2014 (3D Systems). The root mean square estimate (RMSE) values were evaluated, and the deviation patterns on the color maps were further assessed. 
RESULTS: The build angle influenced the dimensional accuracy of 3D-printed restorations. The lowest RMSE was recorded for the 135-degree and 210-degree build angles. However, the overall deviation pattern on the color map was more favorable with the 135-degree build angle in contrast with the 210-degree build angle where the deviation was observed around the critical marginal area. 
CONCLUSIONS: Within the limitations of this study, the recommended build angle using the current DLP system was 135 degrees. Among the selected build angles, it offers the highest dimensional accuracy and the most favorable deviation pattern. It also offers a self-supporting crown geometry throughout the building process.

2. Cloet E, Debels E, Naert I. 
Controlled Clinical Trial on the Outcome of Glass Fiber Composite Cores Versus Wrought Posts and Cast Cores for the Restoration of Endodontically Treated Teeth: A 5-Year Follow-up Study. 
PURPOSE: The aim of this study was to compare the 5-year outcomes of glass fiber composite with cast posts and cores for the restoration of endodontically treated teeth. 
MATERIALS AND METHODS: A total of 143 patients in need of 203 full ceramic restorations on endodontically treated teeth were included. After primary stratification based on the need for post or no post, teeth were randomly allotted to test group 1 (prefabricated glass fiber posts), 2 (custom-made glass fiber posts), or 3 (composite cores without posts). The control group was treated with gold alloy-based wrought posts and cast cores. Success (original present) and survival (present after intervention) probability lifetime curves, corrected for clustering, were drawn over the entire data set. 
RESULTS: The mean follow-up time was 5.8 years (range: 0.5 to 7.2 years). At 5 years, the success and survival probabilities were 85.2% and 91.5%, respectively. Lifetime curves did not show any significant differences between the test and control groups for success (P = .85) or survival (P = .57). Moreover, no significant differences for success or survival could be found among the four groups (the three test groups and the control group). 
CONCLUSION: After 5 years of follow-up, cast gold and composite post-and-core systems on teeth with ceramic full restorations provided with a ferrule performed equally well.

3.
Haider Y, Dimashkieh M, Rayyan M.
Survey of Dental Materials Used by Dentists for Indirect Restorations in Saudi Arabia.
The purpose of this study was to investigate the use and selection of materials for indirect restorations by dentists in Saudi Arabia. A structured 18-item questionnaire was designed and sent via email to all dentists with active memberships in the Saudi Dental Society. A total of 373 dentists (20.2%) out of the 1,846 contacted answered the questionnaire. The majority of the responding dentists (81.5%) prefer to use porcelain-fused-to-metal crowns for posterior teeth, while 77.5% use all-ceramic crowns for anterior teeth. Only 29.8% reported using computer-aided design/computer-assisted manufacture in their practice. There was inconsistency among dentists in material selection, and this was affected by the dentist's gender, years of experience, specialty, and service sector.

4.
Shetty R, Bhat AN, Mehta D, Finger WJ.
Effect of a Calcium Phosphate Desensitizer on Pre- and Postcementation Sensitivity of Teeth Prepared for Full-Coverage Restorations: A Randomized, Placebo-Controlled Clinical Study.
PURPOSE: The aim of this study was to investigate the effect of Teethmate Desensitizer (TD), an aqueous slurry of calcium phosphates, on the pre- and postcementation sensitivity of contralateral premolars prepared for full-coverage restorations.
MATERIALS AND METHODS: In this clinical study, using a split-mouth design, 20 patients were allocated and two contralateral vital premolars per patient were randomly assigned to treatment with TD and placebo (PLA; distilled water). One day after preparation and temporization, sensitivity (PRE) upon air blast (AB) and probe scratch (PS) was determined using a 10-cm-long visual analog scale (VAS). The trial was double-blinded; neither the patient nor the investigator knew the treatment performed. Sensitivity was assessed immediately after treatment, before seating the final crowns after 1 week, and 1 month after cementation. Statistical data analysis was performed with one-way analysis of variance followed by Tukey post hoc test and two-sided paired t test. Statistical significance was determined at alpha < .05.
RESULTS: VAS scores upon stimulation with AB and PS were significantly lower at POST and 1 week, and with AB after 1 month. TD-treated teeth showed significantly less sensitivity than PLA. At the postcementation recall, TD and PLA were not significantly different and the average pain scores were almost 0.
CONCLUSION: Treatment of teeth prepared for full crown restorations with TD can significantly reduce pre- and postcementation sensitivity.

5.
van den Breemer CR, Vinkenborg C, van Pelt H, Edelhoff D, Cune MS.
The Clinical Performance of Monolithic Lithium Disilicate Posterior Restorations After 5, 10, and 15 Years: A Retrospective Case Series.
PURPOSE: Lithium disilicate (LDS) glass-ceramic restorations are routinely used, but results over a period longer than 10 years are rare. The objective of this study was to obtain long-term clinical data on monolithic LDS posterior crowns provided by a single restorative dentist.
MATERIALS AND METHODS: Eligible patients who received a circumferential LDS crown in the posterior region between 1997 and 2010 were invited to participate in a clinical examination in 2015. This consisted of intraoral inspection and radiographs, performed by one observer and according to standardized criteria. Probability of survival was estimated using Kaplan-Meier survival analysis.
RESULTS: A total of 13 patients (n = 87 restorations) fulfilled the inclusion criteria. Of these, 12 patients were available for clinical evaluation (n = 74 restorations). After 5, 10, and 15 years, the cumulative chance of survival of the restoration was 92%, 85.5%, and 81.9%, respectively, with a median observation period of 12.8 years. Of the 74 restorations, 13 failed: 4 because of secondary caries, 2 because of debonding, and 7 because of fracture of the restoration.

CONCLUSION: Lithium disilicate can be regarded as a strong and fracture-load-resistant restorative material providing reliable long-term clinical performance.


A healthy periodontium provides stable gingival margins and stable tooth position prior to tooth preparations for indirect restorations. Good periodontal health allows easier tissue handling during tooth preparation, impression taking and restoration fitting. Periodontal health is integral to successful restorative care. This report documents common clinical scenarios in which periodontal problems cause aesthetic concern.


Dental abrasion is most commonly seen at the cervical necks of teeth, but can occur in any area, even inter-dentally from vigorous and incorrect use of dental floss. Acid erosion has been implicated in the initiation and progress of the cervical lesion, while tooth-brush abrasion has long been held as the prime cause of cervical abrasion. Identification of the risk factors is clearly important in order to modify any habits and provide appropriate advice.


A review of risk factors and management of acid erosion. Particular emphasis is placed on the use of direct composite as a reversible and relatively straightforward restorative option.

Shelley A.
Restoration of Endodontically-Treated Anterior Teeth.
Detailed consideration of a case involving the restoration of an endodontically-treated maxillary canine tooth provides opportunity to review the many different considerations and treatment options in such situations. The restoration of endodontically-treated anterior teeth must be patient-centred, applying materials and techniques best suited to achieve a successful clinical outcome.

11.
Shelley A.
Restoration of Endodontically-Treated Posterior Teeth.
*Primary Dental Journal* 2017 Feb 28;6(1):54-61.
A case study provides opportunity to discuss treatment planning and the selection of materials and techniques to provide a replacement restoration of an endodontically-treated molar tooth. The discussion highlights treatment options along with the strengths and weaknesses of the alternative approaches to achieving a successful clinical outcome.

12.
Wilson N.
Editorial.

13.
Bjorkman L, Sjursen TT, Dalen K, et al.
Long term changes in health complaints after removal of amalgam restorations.
OBJECTIVE: Concerns over adverse effects of mercury released from dental amalgam sometimes lead patients to request removal of their amalgam restorations. Several studies report improvement of subjective health after removal of amalgam restorations, but the mechanisms are unclear. The aim of this paper is to present data on long term changes in intensity of health complaints after amalgam removal in a group of patients with health complaints self-attributed to dental amalgam. Data from the five years follow-up in a clinical trial are presented and related to potential determinants of change.
MATERIALS AND METHODS: Patients previously referred to a specialty unit for health complaints attributed to amalgam restorations were included in the study. The 20 participants who were allocated to the treatment group had all amalgam restorations removed and replaced with other dental restorative materials. Intensity of health complaints was calculated from questionnaire data and personality variables were measured by MMPI-2.
RESULTS: At the follow-up five years after the amalgam removal was completed, intensity of general health complaints was significantly reduced (p=.001), but the symptom load was still high. The reduction was significantly correlated with concentration of mercury in urine at pre-treatment. There were no significant correlations with personality variables.
CONCLUSIONS: Removal of amalgam restorations was followed by a long term reduction of general health complaints, which was associated with mercury concentration in urine before amalgam removal. Additional studies are needed to confirm the potential mechanisms for the observed reduction.
The main reason cited for the replacement of dental composite restorations is the recurrence of caries. Numerous models—both in vitro, with acid gels or bacterial biofilms, and in situ, with dental appliances—have been used to study caries formation around dental composites. The literature shows that many factors may affect caries formation, including marginal gap formation, gap size, the local chemical environment, the durability of the bonded interface, the extent of bacterial penetration, and the presence of mechanical loading. Studies have also shown that what have been called wall lesions may form independent of surface lesions, though not likely due to microleakage through very small gap spaces in the clinical situation. Gap size and mechanical loading have been shown to be related to lesion severity within in vitro models, but these results do not correspond exactly with those obtained from in situ studies using restorations in dental appliances. Though not conclusive, some in vitro models have shown that certain materials possessing antimicrobial characteristics may reduce the severity of lesion formation, suggesting possible pathways for developing new composite and adhesive materials for restorations with potentially enhanced longevity.

OBJECTIVE: To compare the effect of Papacarie and Atraumatic Restorative Treatment (ART) on pain and discomfort during caries removal among children.
STUDY DESIGN: Fifty healthy, 4-8 year-old children were equally and randomly allocated to Papacarie and ART to remove caries from decayed primary teeth. A randomized, controlled, blinded, two parallel-arms clinical trial was conducted in the clinic of the Pediatric Dentistry and Dental Public Health Department, Alexandria University, Egypt in March 2014. Pain and discomfort were assessed blindly by two independent investigators watching videotaped treatment sessions using the Sound, Eye and Motor scale (SEM). Their reliability was assessed using Kappa statistics. The effect of caries removal methods, time spent to remove caries and other confounders on SEM score was assessed using regression analysis.
RESULTS: Mean time to remove caries using Papacarie and ART was 5.8 and 4.8 minutes, P = 0.005. Median Paparie and ART scores for the S, E and M components were 1, 1, 1 and 3, 2, 3. Adjusted mean SEM score= 3.6 and 7.8, P <0.0001. Method of caries removal was the only factor significantly affecting pain and discomfort.
CONCLUSION: Papacarie is associated with minimal pain during caries removal from primary teeth compared to ART, although it has longer working time.

OBJECTIVES: To assess the current choice of various restoration materials among Israeli pediatric dentists according to seniority and specialty.
STUDY DESIGN: Participating dentists completed a 23-item questionnaire on their qualifications, type of practice and preference of restorative material.
RESULTS: Seventy-five dentists (average age 46.27±12.6 years, 58 females) participated. Forty-one were specialist pediatric dentists and 34 were general practitioners. Amalgam was preferred by 49.3%, followed by composite (41.3%), glass ionomer cement (5.3%) and compomer (4%). Only 13.3% of the dentists thought amalgam bears environmental and health hazards, compared to 49.3% for composite. Satisfaction was high for amalgam and composite, less for glass ionomer cements and least for compomer. General practitioners preferred amalgam (70.6%) while pediatric dentists preferred composite (51.2%), P < 0.003.

CONCLUSIONS: Amalgam and composite were the materials of choice among the participating Israeli dentists. Most of them (86.7%) responded that amalgam does not possess any health issues. Their satisfaction with the restoration materials was highest for amalgam and composite, a choice significantly affected by whether they were in general practice (amalgam) or specialized in pediatric dentistry (composite).


OBJECTIVE: To evaluate the degradation of three resin based restorative materials by S Mutans.

STUDY DESIGN: Class I cavity was prepared in extracted premolars and were randomly divided into 3 groups (Group I - Conventional composite (CC), Group II - Resin Modified GIC and Group III-Giomer). Teeth were then restored by respective restorative material and equally divided in two subgroups (Control and Experimental). Experiment subgroup samples were then incubated in 2 ml of BHI with 1:10 dilution of SM (MTCC-497) grown overnight in BHI whereas control subgroup samples were incubated in BHI without SM. The incubation solution was collected at 2, 14 and 30 days interval, and the analysis for identification and quantification of Bis-HPPP was done by High performance Liquid Chromatography.

RESULTS: Statistical analysis of the collected data revealed a statistically increased Bis HPPP production in the presence of SM in all the tested materials, with minimum in Resin Modified GIC and a maximum in Conventional Composite (CC).

CONCLUSION: SM degrades the resin based restorative materials & among the tested materials Resin Modified GIC appears to be most Biostable.


AIM: To evaluate the microleakage of composite restorations following Papain-based chemo-mechanical caries removal compared to the conventional drilling method. The characteristic of the hybrid layer was also studied using scanning electron microscopy.

STUDY DESIGN: The sample included thirty freshly extracted and exfoliated primary molars with open proximal carious dentin lesions. Teeth were divided into two equal groups, according to method of caries removal. Following caries removal, cavity preparations were restored with composite resin. After thermocycling, teeth were sealed apically and coated with nail polish except the surface of restorations and the surrounding 1mm. Teeth were immersed in basic fuschin dye solution, then they were sectioned mesiodistally. The extent of dye penetration was detected using a light stereomicroscope. After microleakage test, the resin/dentin interface was examined using scanning electron microscopy.

RESULTS: There was no significant difference in the degree of leakage between both groups. In the Papacarie group, longer and numerous resin tags were observed with statistically significant thicker hybrid layer than those following the drilling method. However, there was no significant difference between the
diameters of resin tags of both groups.

CONCLUSIONS: Papacarie does not adversely affect the microleakage of composite restorations and provides a suitable surface for bonding.