



Title	Bond strengths of alginate adhesive
Author(s)	Leung, KCM; Chow, TW; Woo, ECW; Clark, RKF
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Vertical bone level changes of cast titanium bridges supported by osseointegrated implants. K. Y. ZEE* and G. S. P. CHEUNG (Faculty of Dentistry, The University of Hong Kong)

The aim of the present study was to investigate the vertical bone level changes around osseointegrated implants with cast titanium bridges in function for 2-3 years. The implant fixtures were screw type and made of commercially pure titanium (Cresco-Ti Concept, Sweden) and the bridges were cast in titanium metal. After insertion of the bridges, standardized periapical radiographs were taken with a customized bite block using paralleling technique (Rinn system, USA) and thereafter at yearly interval. All radiographs were scanned into the computer using a flatbed scanner fitted with a transparency module. Measurement of the vertical bone level at the mesial and distal aspects of every fixture was performed with an image analysis software. The fixture collar edge was used as the reference point for all the vertical measurements. A total of 25 cast titanium bridges supported by 67 implant fixtures were installed in 23 patients. Seven of the 67 implants (10%) failed to osseointegrate. Two fixtures failed after function for around 1 year. A technical failure occurred in one bridge after insertion. Of the remaining 22 bridges included for analysis, only 10 bridges supported by a total of 22 fixtures were followed up to 2 years or more. For these 22 fixtures, 3-year data were obtained for 10 fixtures and 2-year data for the remaining 12 fixtures. These data showed a mean vertical bone loss of 0.2 mm after the 1st year. No further loss could be detected in the 2nd year. The 3rd year result showed a reduced bone loss of 0.1 mm. **In conclusion, the results showed a 90% successful osseointegration and 97% of the remaining fixtures were successful after functioning for 1-3 years. A 0.2 mm alveolar bone loss was detected within a 2-3 year period.** However, a longer follow-up period is needed to confirm the success rate of this implant system. (This study was supported by HKU CRCG Grant 21374017)

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Evaluation of inferior alveolar canal by cross-sectional hypocycloidal tomography. K. ARYATAWONG* and S. ARYATAWONG (Faculty of Dentistry, Prince of Songkla University, Haad Yai, Songkhla 90112, Thailand.)

The purpose of this study was to evaluate the possibility of locating the inferior alveolar canal (IAC) by a new computer-controlled hypocycloidal tomographic machine (CommCAT model IS 2000, Imaging Sciences International Inc, NJ, USA). Twenty four patients, who were referred for radiographic examination before dental implant surgery or mandibular posterior osteotomy, were selected. They were 6 males and 18 females with a mean age of 41.8 years (range 20 to 70 years). The cross-sectional images through the metallic marker at the proposed implant site or through the center of each mandibular posterior teeth were included. The total image of 66 sites were assessed. The visibility of the IAC was classified as excellent, good, fair and invisible. The assessment was separately performed by two observers. The visibility of IAC was excellent or good in 54 sites (81.8%), fair in 6 sites (9.1%). Only 6 sites (9.1%) were invisible. When the IAC was fairly visible or invisible, the gray-scale presentation of the scanned image can be enhanced to improve the localization by using the included SurgPLAN software. **Combined with computer-controlled system, this high-frequency hypocycloidal tomographic unit provides adequate diagnostic cross-sectional image for localization of the IAC and is versatile especially for dental implant planning. However, the accuracy of this machine compared to gold standard should be further investigated.**

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The Clinical Longevity of cantilever resin-bonded bridges. MG Botelho*, CN Lai, WK Ha, SK Bih. Faculty of Dentistry, Prince Philip Dental Hospital, Hong Kong.

The clinical longevity of resin-bonded bridges (RBBs) still appears to be less than that of conventional bridgework. However, recent studies have shown the improved retention rates of RBBs, in particular two unit cantilever bridges (Hussey, Linden, J Dent 1996;24(4):251-6).

The dental literature usually describes single-unit pontic, single-unit retainer bridges restricted to the replacement of lateral incisors from canine abutments. The replacement of any other tooth with such a two unit cantilever is usually deprecated due to possibility of tooth movement.

The purpose of this study was to assess the clinical retention of single pontic, single retainer resin-bonded bridges that were placed in patients from the Prince Philip Dental Hospital, Hong Kong. Thirty-six patients receiving 38 bridges that were placed between April 1992 and January 1997 were clinically examined. Twenty-three female and 15 male patients received 22 upper arch and 16 lower arch cantilever bridges replacing both anterior and posterior teeth. Twenty four of these bridges were placed by staff, 13 by students and one by a postgraduate. The age range of the patient group was 18-77 years with the mean age being 48 years.

The service life of the bridge ranged from 72 days to 67 months with the mean service life for the 38 bridges being 28.8 months. No rotation, drifting or tipping was observed in any of the abutments. The successful clinical retention for these bridges was 97% showing them to be a clinically successful restoration option over the short term. This longevity rate is similar to other clinical studies investigating two-unit cantilever bridge (Hussey, Linden, 1996).

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Flexural strength of different ceramics bonded to low-fusing ceramic. K. SUTTHINON, N. SOMBATTIPYNO AND K. KANCHANATAWEWAT* (Chulalongkorn University, Bangkok, Thailand).

When ceramic restorations are broken, composite resin has been used to repair. The longevity of this repair is uncertain because discoloration of composite resin may occur. Low-fusing ceramic (Optimizer, Vita Zahnfabrik) has been designed for repairing of ceramics. This study investigated the flexural strength of various ceramics before and after being bonded using Optimizer. Thirty five ceramic bars (2.0x1.50x25.0 mm) were used. There were 7 bars per group. The ceramics used were; Group 1) aluminum porcelain (VitaDur-Alpha, Vita Zahnfabrik); Group 2) feldspathic porcelain (Vita-Omega, Vita Zahnfabrik); Group 3) high leucite ceramic fabricated using a pressure molding technique (IPS-Empress, Ivoclar); Group 4) machinable glass ceramic (Dicor-MGC, Dentsply); and Group 5) Vitablocs (Vita Zahnfabrik) which is used in copy milling system (Celay). All tested samples were fabricated following their manufacturers' recommendations. Bars were testing in a three-point-bend test on a universal testing machine (crosshead speed of 0.2 mm/min). After being broken, each bar was then bonded using Optimizer and fired at 990° C under vacuum following manufacturers' recommendations. Bars were then subjected to the same testing method. ANOVA and Tukey statistical analyses were performed on the data. Mean flexural strength (X±SD, MPa) of Group 1-5 were 57.21±10.58, 43.08±7.45, 91.39±12.81, 234.43±20.01 and 118.76±4.43. Flexural strength of after being bonded of Group 1-5 were 60.62±3.68, 15.33±5.34, 4.55±3.20, 41.36±2.40 and 45.75±4.25. Only aluminum porcelain bars showed no significant difference (p<0.05) with before and after being bonded using Optimizer. **Over all results indicate that Optimizer should only be used for repairing aluminum porcelain.** Supported by Dental Research Fund, 3205-312424/1997 Faculty of Dentistry, Chulalongkorn University.

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Two-year clinical performance of resin-modified glass ionomer sealant. R.J. SMALES* and K.C. WONG (Faculty of Dentistry, University of Hong Kong, SAR).

There have been very few reports of resin-modified glass ionomer cements (RMGIC) developed for pit and fissure sealants. Therefore, the present study compares the 2-year clinical performance of an experimental RMGIC (K-512 = Fuji III LC) with that of a light-cured resin-based sealant (Delton Opaque) placed in the permanent teeth of young adults aged from 15-27 years. K-512 was placed after enamel etching with 10% PAA for 10s, and then light-cured for 40-60s. Delton was placed after etching with 37% phosphoric acid for 30-40s, and then light-cured for 20s. Colour photographs (preceded by enamel etching for K-512 at two years), bitewing radiographs, and impressions for replicas were taken at baseline and at two years. Fourteen subjects with 47 K-512 and 41 Delton sealants were reviewed at two years. K-512 showed 0% complete retention, 62% partial retention, and 38% nil retention. For Delton, the percentages were 32%, 58%, and 10% respectively. There was one instance of fissure caries for K-512 and three instances for Delton. K-512 sealants continued to darken over the study, many becoming slightly darker than the sealed teeth. Small voids were detected in 27% of the Delton sealants.

The low retention rate of K-512 implies caution for its long-term single-application preventive and therapeutic use in young adults (supported by G.C. International ; RGC Award 338/252/0001)

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In-vitro fluoride release of new generation restoratives. A. YAP*, E. KHOR and FOO S.H. (National University of Singapore, Singapore).

This study compared the amounts and pattern of fluoride release of new generation restoratives over a 35 days period. Materials evaluated included 2 fluoridating composites (Tetric, Vivadent; Experimental X, Shofu); 2 composites (Dyract, Dentsply; Compoglass, Vivadent); and a resin-modified glass ionomer cement (Fuji II LC, GC). A conventional glass ionomer (Fuji II Cap, GC) was used as control. Five specimen discs (6.0 ± 0.1 mm diameter and 1.2 ± 0.1 mm thick) of each restorative materials were formed as per manufacturer's instructions. The discs were removed from their moulds after 1-hour storage at 37°C-100% humidity and measured. They were then soaked in 9ml of deionized water and placed in an orbital incubator at 110 rpm and 37°C. 24 hours later, each specimen was rinsed with 1 ml of deionized water and transferred to a fresh storage medium. The rinse water was added to the container with the storage medium and the fluoride ion content was determined by means of ion chromatography. This regimen of specimen transfer and fluoride analysis of storage medium was continued for 35 days. The data for total weekly fluoride release and total fluoride release was subjected to Kruskal-Wallis and Mann-Whitney U Wilcoxon Rank Sum tests at significance level 0.05. Ranking of materials from least to greatest total fluoride release over 35 days was as follows: Tetric < Experimental X < Dyract < Fuji II LC < Compoglass < Fuji II Cap. **Fuji II Cap had significantly greater fluoride release than all other materials evaluated. Fuji II Cap, Fuji II LC and Compoglass had similar patterns of fluoride release characterized by a high initial release that was many times higher than that released later. The fluoridating composites evaluated stopped releasing fluoride by 14 days.**

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Bond Strengths of Alginate Adhesive. Leung KCM*, Chow TW, Woo ECW, and Clark RKF Faculty of Dentistry, University of Hong Kong

This *in-vitro* study determined the various bond strengths of alginate adhesive and investigated the effect of drying time on the cleavage strength. Three testing assemblies were designed and machined in stainless steel for tension, shear and cleavage tests. Tests were made with and without adhesive (Fix™) which was dried for 5 minutes before alginate (Blueprint™) was loaded.

Breaking stresses of alginate without adhesive were found to be 65 kPa (tension), 31 kPa (shear) and 10 kPa (cleavage) suggesting cleavage is the most probable mode of failure during tray removal. The bond strengths of Blueprint™ with Fix™ were 100 kPa (tension), 42 kPa (shear) and 37 kPa (cleavage) giving improvements of 53%, 37% and 270% respectively (p < 0.05). The cleavage breaking stress of minimal drying of 1 minute (32 kPa) improved moderately up to 5 minutes (37 kPa) but decreased on further drying. **In conclusion, adhesive increases the bond strengths of alginate, particularly cleavage, to stainless steel. Drying of adhesive in excess of 5 minutes is not recommended.**

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Perception of the learning process in first year dental students. A K H Pau & *D A Luke. (Fakulti Pergigian, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia)

The aim of the investigation was to explore students' perception and evaluation of some features of problem-based learning (PBL) and of traditional teaching. Twenty three dental students completed a fully structured questionnaire containing eighteen statements, each describing a feature of PBL or a feature of traditional learning. The students were required to evaluate each statement according to a 5-point Likert scale from 'strong disagreement' to 'strong agreement'.

91% of students strongly agreed that the learning process should focus on understanding, application and enjoyment; 65% strongly agreed that during the learning of basic dental sciences, references should be made to their clinical relevance; 48% of students strongly preferred lectures to small group discussions whereas only 9% strongly preferred small group discussions to lectures. 35% of students strongly believed that teachers rather than students should be responsible for finding reading resources whereas only 4% were strongly of the reverse opinion. When responses to features of PBL and of traditional teaching were plotted against each other, we found that individual students who approved of PBL features often also approved of traditional teaching. This suggests that the students in the sample did not have a strong liking for one particular learning approach or were unsure of their overall preference.

We conclude that the first year preclinical dental students approved of some features of PBL, for example the focus on the understanding and application of knowledge and the enjoyment of the learning process. They also strongly believed that basic science teaching should overlap with clinical teaching but they preferred lectures to small group discussions. This study suggests that students could benefit from improving their skills in group discussions and in information retrieval: it is important that new students become proficient in these activities if they are to take full advantage of PBL. The study also confirms our belief that learning should involve more than one approach; that is, it should be polymodal rather than unimodal.