In Patients Requiring Single-Tooth Replacement, What Are the Outcomes of Implant- as Compared to Tooth-Supported Restorations?

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Purpose: *The study provides a systematic review of the literature to determine the long-term survival characteristics of single implant-supported crowns and fixed partial dentures.* ***Materials and Methods:*** *A search of the MEDLINE, EMBASE, and Cochrane Collaboration databases was conducted to identify articles that compared survival and success of fixed partial dentures and single implant-supported crowns. In addition to comparative cohort studies, articles that pertained specifically to single implant-supported crowns or fixed partial dentures were included in this review. Inclusion criteria for implant and fixed partial denture articles included a minimum 2-year study, primary publication in the English language, a minimum of 12 implants, implants designed to osseointegrate, and inclusion of data regarding implant and prosthetic performance. Data were analyzed using cumulative proportions of survival and success for both prosthetic types and for individual implants. Wilson score method was used to establish 95% confidence intervals for each population. The chi-square test for homogeneity was performed.* ***Results:*** *The literature search failed to identify any articles that directly compared survival or success of single implant-supported restorations with fixed partial dentures. Following the search criteria, and independent analysis by reviewers, 51 articles were identified in the implant literature (agreement, 95.42%; kappa coefficient, 0.8976), and 41 were identified in the fixed partial denture literature (agreement, 90.97%; kappa coefficient, 0.7524). Pooled success of single-implant restorations at 60 months was 95.1% (CI: 92.2%–98.0%), while fixed partial dentures of all designs exhibited an 84.0% success rate (CI: 79.1%–88.9%).* ***Conclusions:*** *This systematic review of the scientific literature failed to demonstrate any direct comparative studies assessing clinical performance of single implant-supported crowns and tooth-supported fixed partial dentures. The analysis suggested differences at 60 months between survival of implant-supported single crowns and natural tooth-supported fixed prostheses when resin-bonded and conventionally retained fixed prostheses were grouped. This difference disappeared when implant-supported single crowns were compared with conventionally retained fixed partial dentures at 60 months. For other time periods, direct comparative data were unavailable.* Int J Oral Maxillofac Implants 2007;22(suppl):71–95.

Key words: *etched bonded dentures, fixed partial dentures, implant-supported restorations, implant-supported single crowns, implant-supported single-tooth restorations, resin-bonded fixed partial denture, success, survival*

Patients with missing teeth face the prospect of tooth replacement either through the use of removable prostheses, fixed natural tooth–supported prostheses, or implant-supported prostheses. Each of these prosthetic designs has inherent risks and benefits.

Although it is possible to replace single teeth using a removable partial denture, these restorations are generally considered provisional in nature rather than definitive. For this reason, removable partial dentures were not considered in this review. In distinction, fixed natural tooth–supported prostheses (FPDs) and implant-supported single crowns (ISCs) may be more applicable to the restoration of the single missing tooth. When considering either of these treatment options, the clinician must weigh the risks and benefits of either approach. Careful scrutiny of the scientific lit-

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erature may assist the clinician in determining the treatment when a single-tooth replacement is needed.

Previous systematic reviews of implant-supported single restorations demonstrated that failure of osseointegrated implants occurred relatively early in the period of follow-up.[1,2] The prosthetic complications of ISCs, however, seemed to be infrequent and easily correctable in comparison with other types of implant-supported or retained restorations such as overdentures or fixed partial dentures.[3]

Previous systematic reviews of fixed tooth-supported partial dentures demonstrated both biologic and structural complications occurring relatively long after initial prosthesis insertion.[4–6] In meta-analyses of resin-bonded FPD (RBFPD) studies, it is apparent that these restorations have therapeutic advantages in the short term.[7] It was of interest to the authors and the sponsorship by the Academy of Osseointegration to include a representative population of RBFPDs and fixed partial dentures and restorations for survey of survival characteristics.

The purpose of this study was to conduct a systematic review of the scientific literature to assess the success and/or survival of ISCs in comparison to FPDs.

MATERIALS AND METHODS

The dental literature was searched from 1966 to August 2004 using MEDLINE, Cochrane Collaboration, and EMBASE to determine a list of scientific articles pertaining to clinical use of dental implants and FPDs in humans. The 2 individuals also reviewed a master list of implant articles supplied by an advisory group of the Academy of Osseointegration to determine article applicability to the primary question using the established inclusion criteria. Each reviewer searched the references independently. When disagreement was found, the articles were discussed until agreement was reached. Calculations were made to determine percentage of reviewer agreement and the kappa coefficient. References from the identified articles were hand searched.

Inclusion Criteria

The master lists were sorted to determine the presence of articles pertinent to single implant-supported restorations, FPDs, and RBFPDs. The list of articles that related to single implant-supported restorations was then reviewed through comprehensive assessment of each original article.

Implant-supported Restorations. Articles were included in the data extraction section of the systematic review if they demonstrated at least 2 years of clinical survival, included a minimum of 12 restorations, had been first published in the English language, and presented data that could be extracted. Anticipation of attrition rates of 20% or more[8] resulted the decision to include studies with a minimum of 12 FPDs or single implants with restorations for review. Only studies that clearly differentiated ISCs from other prosthetic designs were included. Only clinical studies of adult subjects could be included. Animal studies, in vitro studies, technique articles, and case reports were all excluded from this review.

FPDs. Articles were included in the data extraction section of the systematic review if they demonstrated at least 2 years of clinical survival, included a minimum of 12 restorations, had been first published in the English language, and presented data that could be extracted.

Data Extraction

Data were extracted from the references relative to implant survival, prosthesis survival, and method of failure as it applied to ISCs. Similarly, data were extracted from references relative to tooth survival, prosthesis survival, and mode of failure as applied to FPDs. Data were extracted relative to time; when time-dependent data were unavailable, articles were rejected from the review.

Data extraction tables were created to determine time of implant placement, time of prosthesis service, implant survival rate relative to time, and prosthetic complications relative to time. Surgical success (a term that can be used interchangably with "survival" here) as well as prosthetic complications from each study were recorded. Data were extracted for all time periods in the original article. Data extraction from fixed prosthodontic literature was performed to determine prosthesis success and survival and prosthesis complications relative to time of service.

The data were analyzed by Howard Proskin and associates and are described in an article elsewhere in this issue. The data are depicted in forest plots with associated 95% confidence intervals. Data were surveyed by dichotomization to either the ISC or the FPD group. The level of influence by factoring RBFPDs out of this data set was also examined.

Statistical Methods

All studies that reported cumulative proportional implant survival, implant success, or prosthetic success for at least 1 examination and at least 1 treatment were included in the analysis. The cumulative proportions were assumed to describe all implants in the treatment group. The last reported implant survival, implant success, and/or prosthetic success for each treatment from each article were used to derive

overall estimates of implant survival, implant success, and prosthetic success, respectively. In addition to finding overall estimates for each proportion, the meta-analysis was performed for different timepoints. A pooled estimate of implant survival, implant success, and prosthetic success was derived for each timepoint as well as for the last examination.

Point estimates of implant survival, implant/tooth success, and prosthetic success from each article are depicted graphically in forest plots for each timepoint and overall. The Wilson score method was used to derive a 95% confidence interval for each proportion.[9,10]

A random-effects model was necessary for calculating the pooled estimates when there was heterogeneity between studies. According to the chi-square test for homogeneity, there was significant heterogeneity between studies in almost all cases.[11] A random-effects model was used even if homogeneity was not rejected at the 0.05 level, because there seemed to be heterogeneity between the studies. There were a few cases where a treatment group only included a single study or where all studies in a treatment group had 100% implant survival, implant success, or prosthetic success; in these cases, a fixed-effects model was used to derive the pooled estimate. The random-effects model was used in all other cases.

The method of generalized estimating equations was the use of the random-effects model to combine rates from individual studies.[12] This method accounted for the between-study variability. Pooled Wilson score confidence intervals (CIs) were used in the fixed-effects model. Estimates were computed using R. 2.2.1 (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

A preliminary review of the scientific literature identified 1,766 articles that were included into a database. No direct comparative studies assessing the success or survival of ISCs and FPDs were identified through this literature review. Consequently, the original plan to perform a systematic review of 2 approaches to therapy was abandoned. Instead, the 2 treatment approaches were evaluated relative to prognosis. Few studies were identified with overlapping time periods for either FPDs or ISCs. Because there were no direct comparative studies, most results provided in this review are descriptive in nature.

ISC Literature

A secondary search of the literature was combined with the master list; this produced 174 full-text articles related to single-implant restorations for which abstracts were reviewed according to inclusion/exclusion criteria.[1–3,13–183] A total of 13 of these studies were excluded by both reviewers. An additional 8 studies were not agreed upon by the reviewers. Consequently, these articles were discussed and ultimately, 7 of the articles were excluded through this arbitration process (agreement, 95.95%; kappa coefficient, 0.7666). The second stage of manuscript review was initiated on the group of 153 articles. After this screening, 98 articles were agreeably eliminated by both authors based on inclusion criteria. An additional 7 articles were in dispute. Discussion and arbitration of these articles allowed inclusion of 3 (agreement, 95.42%; simple kappa coefficient, 0.8976). This created a total of 51 articles.* After hand searching, an additional 3 articles were included (Figs 1 to 3).[184–186] No articles were added after the cutoff date of May 31, 2005 (see the ISC Inclusion List available in the Web edition of this article).

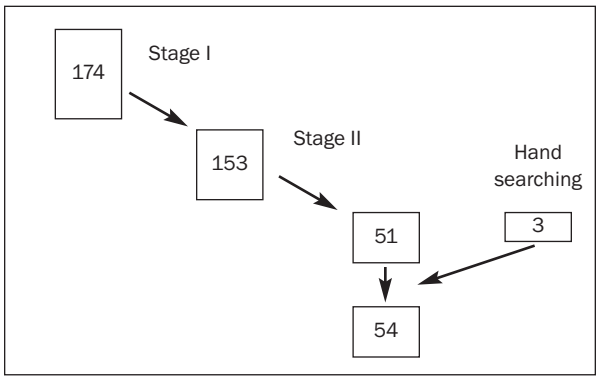

Fig 1 Application of inclusion/exclusion criteria to the literature on single-implant restorations.

FPD Literature

The fixed prosthodontic literature yielded an initial list of 265 article abstracts.[1,4–7,44,45,117,132,164,187–447] Five meta-analyses were also found.[1,4–7]

A stage I review was conducted and disclosed mutual acceptance of 156 manuscripts by each author. One hundred six manuscripts were agreeably negated by the 2 reviewers, and 3 additional articles were in dispute. These articles were discussed, resulting in the addition of 1 additional article for further review (agreement, 98.87%; kappa coefficient, 0.9765). A total of 155 full-text articles were agreed upon. At Stage II, 30 manuscripts were mutually accepted, 111

* References: 16, 18–23, 25, 26, 30, 42, 52, 55, 57, 65, 70, 71, 74,76, 78, 80, 84, 86–89, 92, 96, 104, 106, 109, 115, 116, 127, 131, 133, 134, 136, 138, 144–146, 150–153, 171, 172, 174, 175, 176

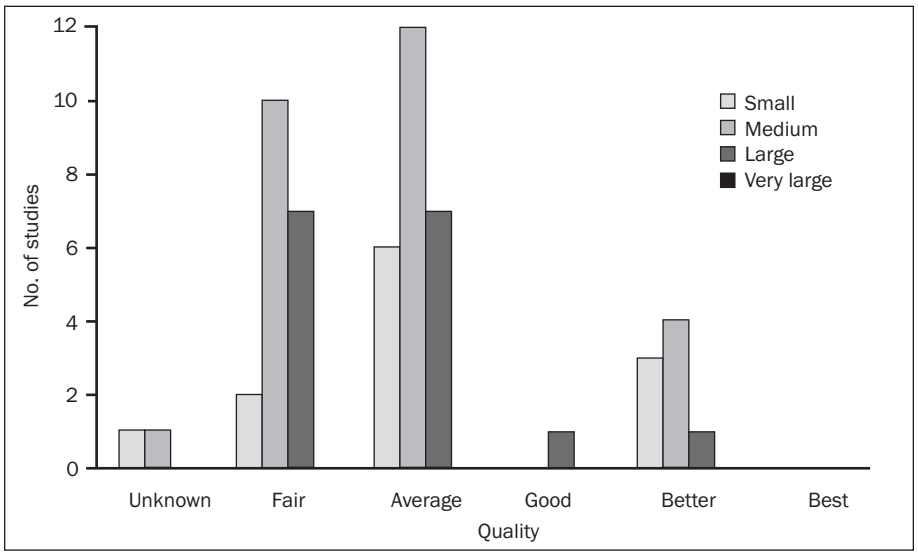

Fig 2 Size and quality of implant studies.

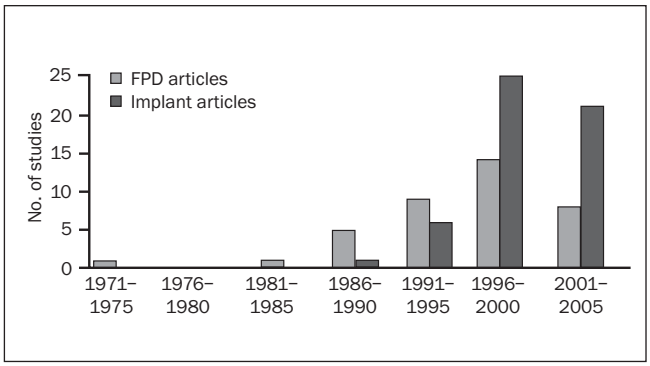

Fig 3 Article distribution by year.

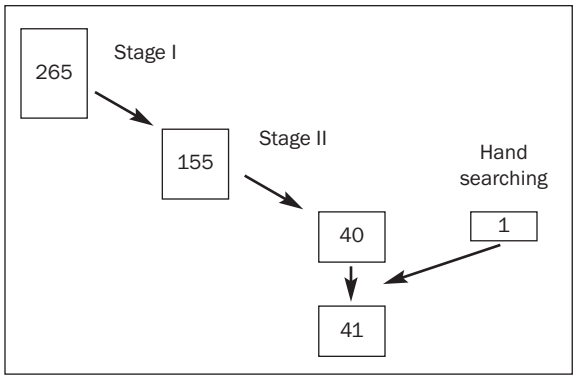

Fig 4 Application of inclusion/exclusion criteria to the literature on FPDs.

were mutually rejected, and 14 articles were in dispute. After discussion, it was agreed to accept 10 of the disputed articles and reject the remainder (agreement, 90.97%; kappa coefficient, 0.7524). Hand searching provided an additional article, resulting in 41 articles for data extraction (Figs 3 to 5; see the ISC Inclusion List available in the Web edition of this article).**

Characteristics of ISCs

Although many authors described successful treatment, success criteria were rarely identified in articles. Consequently, results will be described relative to survival only. ISC articles were surveyed for survival information. Generally both surgical survival and prosthetic survival were described. Most frequently implant survival was described in terms of cumulative survival (Fig 6). Several studies[26,30,70,152] enrolled relatively large numbers of subjects (252 to 282); the survival proportions for these studies were proportional to those observed in most other studies. The implants placed in these 4 studies (n = 1,064) composed 36% of the entire implant population in this systematic review.

Early reports demonstrated higher numbers of prosthetic complications, including screw loosening and fracture. With the development of implants containing internal connections and other strategies for the partially dentate patient, abutment screw loosening and fractures were observed less frequently in more current literature. Implant prosthetic success was termed as the outcome of the implant prosthesis, assuming the implant remained integrated, while complications were described if a complication required intervention but not prosthesis refabrication. Figure 7 illustrates this level of prosthetic success at 60 months.

Immediate loading with a provisional restoration was assessed in 2 studies with favorable results, although the study numbers were low and the follow-up period short.

** References: 191, 198, 200, 204, 209, 213, 231, 235, 237, 238, 247, 250, 260, 274, 278, 289, 293, 296, 299, 312, 318, 340, 343, 355, 366, 368, 375, 377, 378, 380, 382, 386, 390, 394, 397, 407, 416, 423, 429, 434, 446

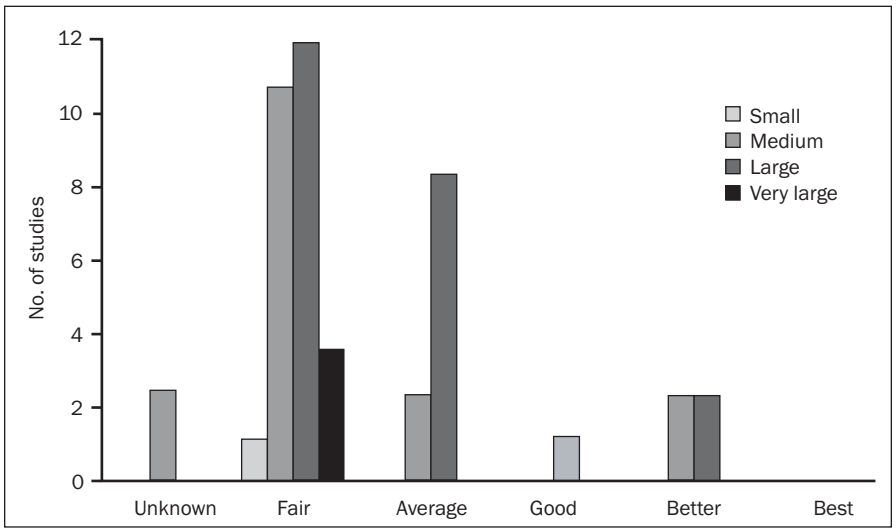

Fig 5 Size and quality of FPD studies.

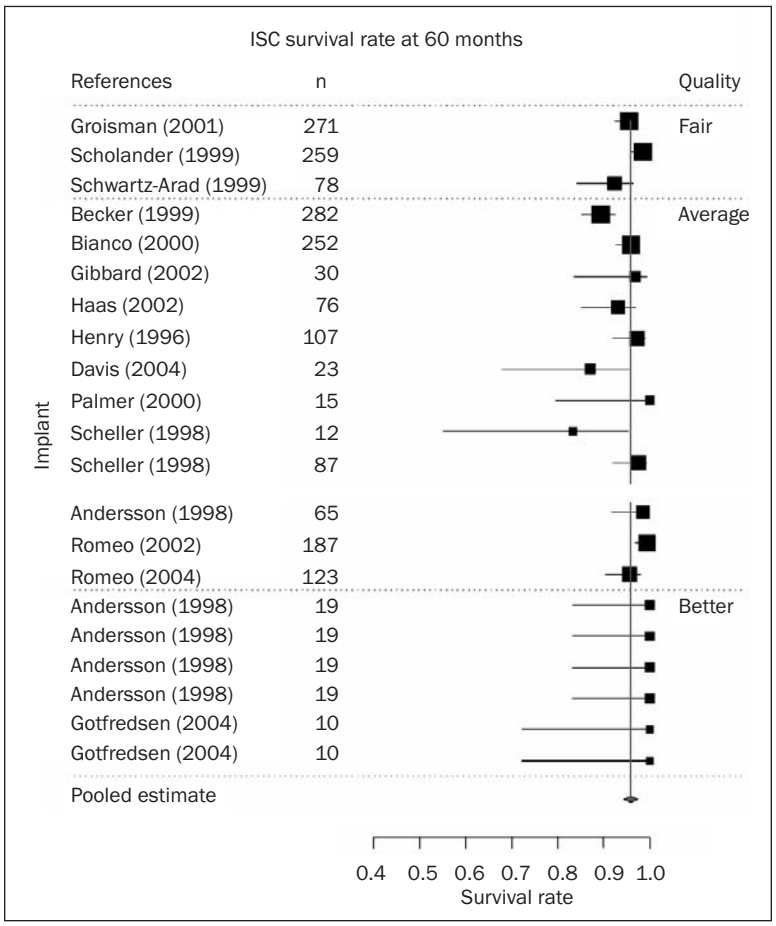

Fig 6 ISC survival rate at 60 months.

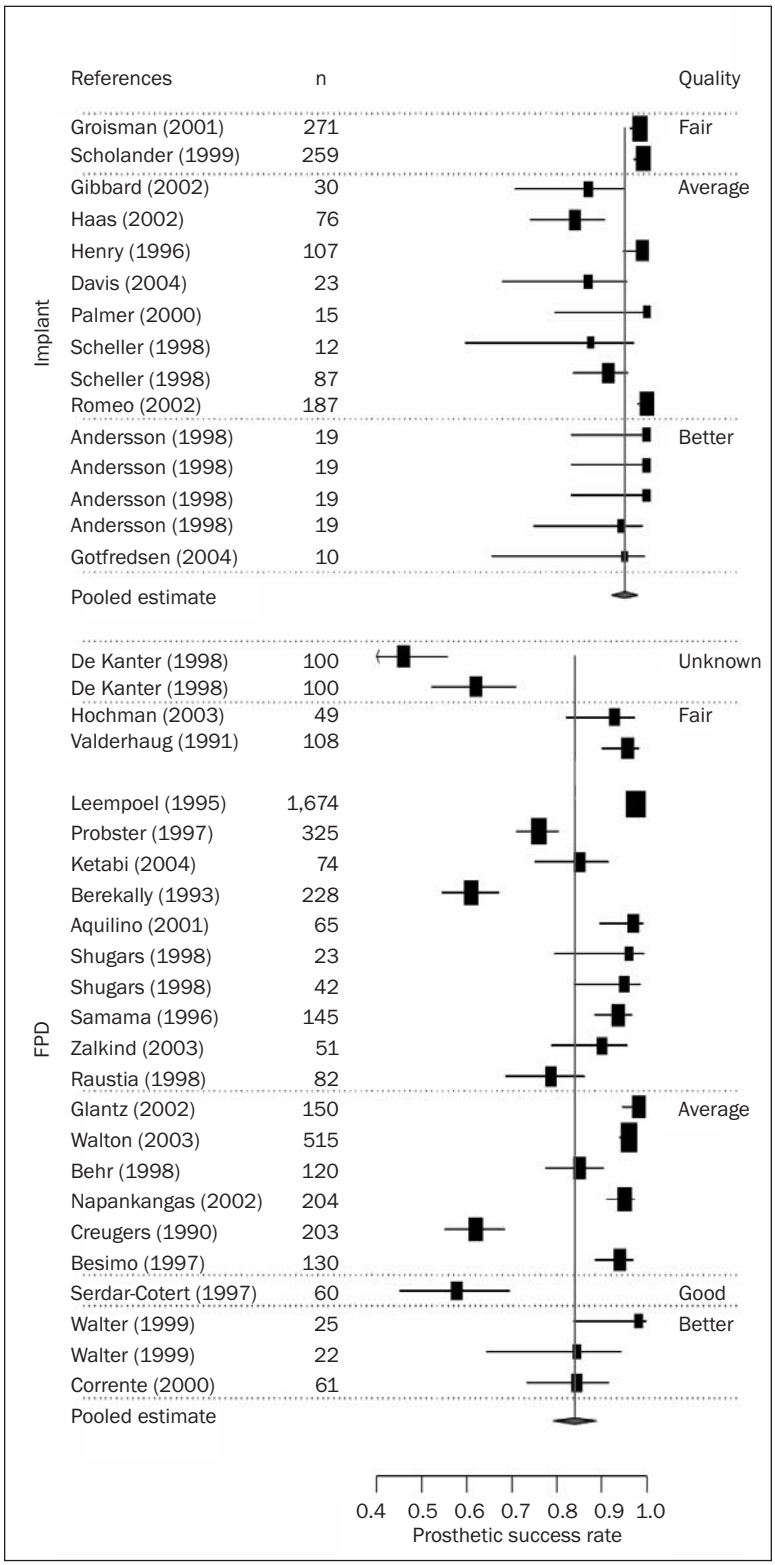

Fig 7 ISC prosthetic success rate at 60 months.

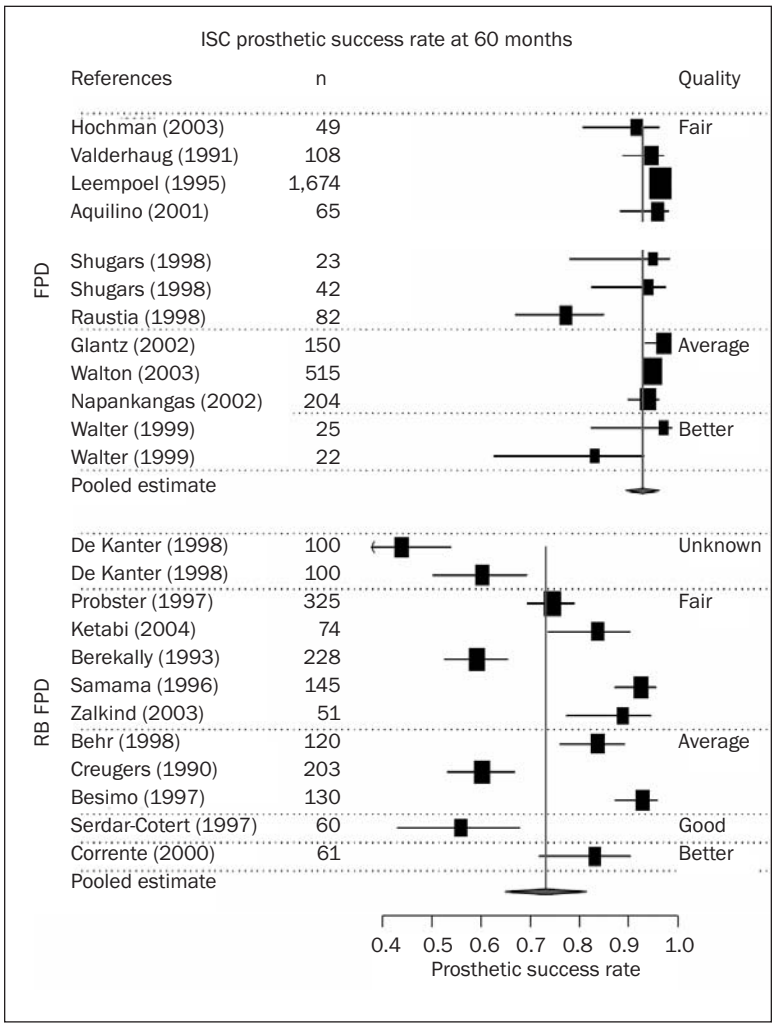

Fig 8 Implant/tooth prosthetic success rate at 60 months for conventional FPDs and RBFPDs. Note: implant success rate same as Fig 7.

Seven ISC studies were classified as high-quality prospective studies. The studies so classified were those that were identified as RCTs,[88] made an effort to describe esthetic differences by 1- or 2-stage surgical approaches,[186] compared immediate loading of implants to delayed loading,[134] used a parallel arm design using different types of materials for abutment connection,[20,173] or prospectively analyzed parallel groups of trained clinicians.[18] Several of these studies had either a large group of subjects and/or long follow-up periods with minimal attrition.

Most of the studies appeared to have a low level of prosthetic complication, with the exception of 5 studies.[22,23,25,74,80] The increased prosthetic complication rate was perhaps related to early component designs that were originally developed for the management of edentulous patients. A total of 2,963 single-tooth restorations were examined in the 54 studies identified.

Characteristics of FPDs

The prosthetic success rate of FPDs is shown in Fig 7 for comparison with the ISC group. A nongrouped comparison results in some difference, which is probably attributed to the variability of the RBFPDs (Fig 8). Many studies cited disease markers such as caries, periodontal disease, endodontic pathology, or structural failures but did not relate these to specific timepoints demonstrating prosthetic survival relative to time. Several of the conventional FPD studies described partial veneer retainers[382] or cantilever designs[23,289,312,355,407]; the FPDs in these studies equated to less than 30% of the total number of FPDs.

Failures were attributable to mostly biologic parameters, such as caries,[274,278,318,377,307] periodontal disease,[231,250] or endodontic pathology.[231] Structural complications were related to retention[289,416] or abutment fracture.[434]

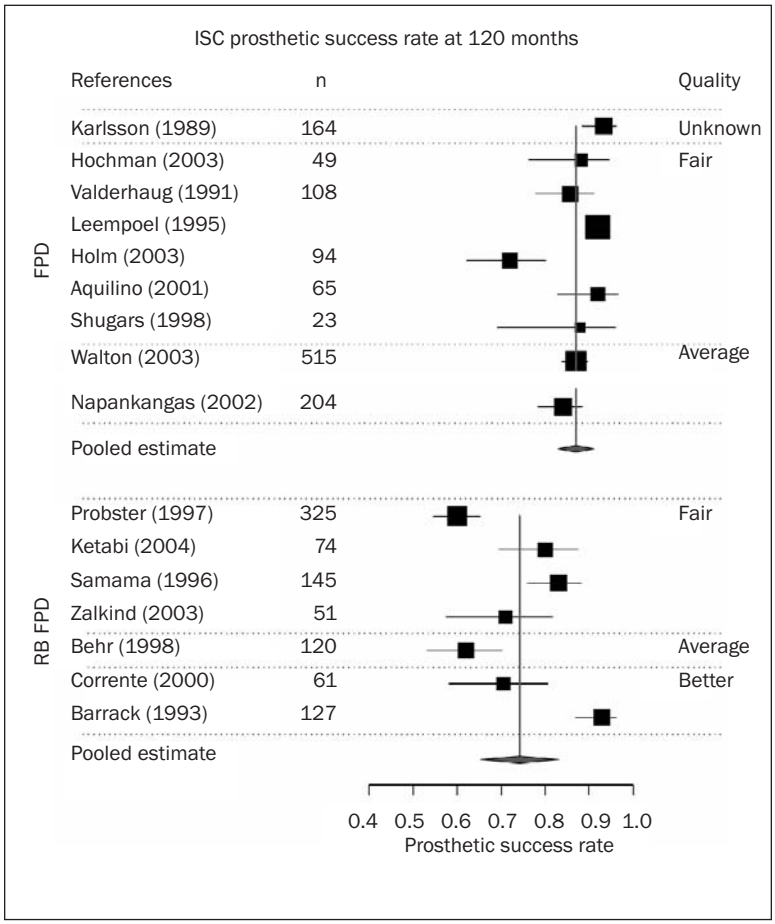

Fig 9 ISC prosthetic success rate at 120 months.

Caries seemed to be the most prevalent complication in most studies, but some authors[289] remarked that loss of retention is usually the primary initiating factor, whereas caries becomes a secondary consequence. Others maintained that retention and caries are seen prevalently at 2 different timepoints and are unrelated.[416]

Data extraction from studies on RBFPDs demonstrated a greater degree of variability of long-term success. Many of the parameters for improving outcomes cited differences in preparation design, alloy selection, surface treatment of alloy, framework design, and pontic number. In contrast to the biologic failures encountered with conventional FPDs, RBFPDs demonstrated failure secondary to structural complications. Some authors maintained that preparation of the abutment teeth made a significant difference in long-term survival.[197,200,203,375] Other studies did not corroborate this suggestion.[368] Alloy treatment with etching alone versus silicoating was found to enhance retention in some studies and make a significant difference in long-term survival.[299,368] Other studies showed that this factor is not a consideration in long-term survival.[375] Base metal alloys seem to enjoy a resistance to debonding in comparison to palladium alloys. Most of the studies indicated that debonding at the resin-metal interface is the weak link and that stresses leading to debonding are transferred to this interface. Despite suggestions for all of these preparation variables, contemporary materials, and surface treatments, the long-term predictability remains highly variable. Survival data at the 60-month timepoint were demonstrated in studies by Berekally and associates,[203] Probster and Henrich,[368] and Creugers and colleagues.[237]

Six studies were rated as better studies because of their prospective design.[235,237,238,377,390,429]

Single implant-supported restorations demonstrated apparent high surgical success rates and high prosthetic success rates. Surgical failures appear to occur early. Prosthetic complications also appear to occur early and gradually taper off over time. Prosthetic success at 60 months was 95.1% (CI: 92.2%–98.0%). The 60-month timepoint was chosen to survey the greatest number of studies that documented follow up at this specific time.

FPD success was analyzed in 2 different ways. The first method combined conventional FPDs with RBFPDs. For this population, prosthetic success was examined at 60 months (84.0%; CI: 79.1%–88.9%; Fig 7), 120 months (81.3%; CI: 75.9%–86.7%; Fig 9), and 180 months (67.3%; CI: 50.1%–84.5%). The second method of analysis was to look only at FPDs retained conventionally. Prosthetic success was 94.0% (CI: 90.7%–97.3%) at 60 months (Fig 8), 87.0% (CI: 82.8%–91.2%) at 120 months, and 67.3% (CI: 50.1%–84.5%) at 180 months.

Several trends are noted within the population of each group (Table 1). For example, implant-supported prostheses were at higher risk soon after implant placement. The ongoing risk of implant failure was relatively low, but confidence intervals widened as long-term study enrollment diminished. Also, FPD studies did not evaluate clinical performance at early stages. FPD studies were longer-term studies, and confidence intervals were quite wide because of patients/prostheses that were lost to follow-up or low long-term study populations. Also, more studies of implant-supported prostheses than FPD studies were found in the "better" and "best" groups. Finally, FPD studies tended to be smaller studies of lower quality.

Table 1 Pooled Data at 60, 120, and 180 Months

Population/timepoint	Pooled success (%)	CI (%)
Implant-supported restorations		
60 mo	95.1	92.2–98.0
120 mo	—	—
180 mo	—	—
Tooth-supported FPDs		
60 mo	94.0	90.7–97.3
120 mo	87.0	82.8–91.2
180 mo	67.3	50.1–84.5
RBFPDs		
60 mo	74.7	66.6–82.8
120 mo	74.2	65.3–83.1
180 mo	—	—

DISCUSSION

The State of the Science of Implant Dentistry was originally conceived as a systematic review of the scientific literature as it relates to implant and natural tooth-supported restorations. This systematic review addressed the PICO question, "In patients requiring single-tooth replacement, what are the outcomes of implant- as compared to tooth-supported restorations?" No direct comparative studies were identified through this review. However, during the data gathering phase of this review, it was clear that a large volume of scientific literature is available on the subject of survival of ISCs and FPDs. This information served to provide the bulk of this review. Efforts were made to be as inclusive as possible when selecting articles. This resulted in a large number of articles for both comparison groups.

During the course of data extraction and analysis it became quite clear that direct comparisons of these 2 treatment groups would be difficult. The primary reasons for this were related to the large number of different treatment interventions and the myriad of reporting methods used by authors. In addition, the treatment periods were quite different between tooth- and implant-supported restorations. After comprehensive data extraction was performed, it was clear that the primary outcome for assessment was simply survival of the restoration, retaining teeth, or implants. The exact mode of failure was rarely determined through assessment of the available literature. Furthermore, direct comparison between specific time periods was generally not possible. In general, implant studies reported earlier data, while tooth-supported studies demonstrated more long-term data. The exception to this occurred with the etched and bonded tooth-supported restorations; these reports were generally shorter in duration than the other fixed prosthodontic reports.

In preparing this systematic review, the reviewers were faced with a number of dilemmas. The variety of procedures performed in fixed prosthodontics on natural teeth is quite broad. Although it was tempting to separate data from etched and bonded restorations from the data pertaining to more conventional fixed prosthodontic therapy, doing so would have negated treatment that had been originally described as definitive care. In retrospect, that definitive care may not have been as long-lasting as anticipated when the procedures were planned. Of course, there is recognition that any study could lead the investigators in positive or negative directions; it is this uncertainty that is the reason for the investigation. Accepting this, the reviewers have provided data regarding all fixed prostheses of all designs and have also separated the data from the etched and bonded restorations from more conventionally retained restorations.

In the implant literature there are a number of different implant designs, manufacturers, prosthetic designs, and general treatment approaches that have been used. Once again, it was difficult to establish a subcategory for each treatment method. Consequently, the data from implant-supported prostheses were analyzed primarily as related to implant survival and subsequent prosthetic survival.

In both literature sets there was a distinct lack of consistent data reporting based upon specific time periods. Many articles described the survival only at the end of a study period, while other articles provided life table data from annual patient reassessments. When considering studies that have not provided time-dependent data, it is often difficult to determine the actual length of service for any specific prosthesis. For example, an article that describes 10-year results of a certain treatment method may actually be reporting results of prostheses in place for a period ranging from days to 10 years. Many of these studies failed to report the mean time of service; it was left up to the reader/reviewer to interpret this time of service.

Direct comparison of the implant- and tooth-supported prosthetic results, given the lack of comparative time periods, was virtually impossible. Despite the large volume of literature that exists on both topics, the direct comparison of treatment outcomes for specific time periods was not realistic. To address the situation it was necessary to either provide descriptive results or attempt to consider the slope of survival graphs, looking at survival relative to time. But even this was not possible, given the fact that many of the studies lacked annualized data. The situation was further complicated by studies that provided only cross-sectional data, as inclusion of these studies into a larger database could not be done with confidence.

Understanding all the aforementioned caveats, the reviewers have attempted to provide their impressions of the survival relative to time. Two distinct impressions are drawn from this information. Survival within implant-supported prostheses demonstrates a rapid, although small, early decline followed by long-term stability. Once the early failure period (generally the result of failure of the implant to achieve integration with bone) has passed, the prostheses appear to demonstrate a predictable long-term service. The overall early failure rate is generally less than 5% during the first year of service. Over the next 5 to 10 years, the failure rate diminishes.

In contrast, fixed prostheses supported by natural teeth appear to have very low early failure rates. The exception to this occurs with etched and bonded restorations, where some reports demonstrate surprisingly high early failure rates in comparison to conventionally retained FPDs. Long-term survival of fixed prostheses supported by natural teeth appears to be lower than the projected long-term survival of prostheses supported by dental implants. However, this statement is the result of extrapolation rather than an observance of long-term survival curves, since those studies do not exist for ISCs.

Most of the published scientific literature concentrated on simple survival of dental implants and simple survival of FPDs. However, other criteria for implant success exist which are not routinely applied. The reason for this could be reluctance on the part of the authors to claim "success," inability on the part of the authors to assess success, or realization that the success criteria are too stringent for the implants used in the authors' studies. Regardless of the reason, most implant studies continue to discuss survival alone but have cloaked this discussion under the terms of success. In addition, few studies have described complications associated with implant therapy. Clinicians certainly recognize that a number of complications can occur with implant-supported prostheses. Implant failure or fracture, screw loosening or fracture, material wear or fracture, and failure of luting agents are the most commonly described complications. It is also recognized that implant malposition, soft tissue recession, bone loss, and unfavorable soft tissue configuration, texture, or color are complications that must be reported. Since these factors have not been consistently reported, it is the recommendation of the authors of this systematic review that it become standard procedure to record and report these elements in future scientific publications.

Returning to the initial premise of the State of the Science of Implant Dentistry workshop, it seems appropriate to state that definitive answers cannot be drawn from this systematic review of the literature. Generalized impressions of the data provide the reviewers with a perception of the outcome from the 2 different treatment arms, but this impression is the result of data interpretation rather than simple data analysis.

Accepting the notion that the scientific data are not available to answer the question posed by this workshop, it may be prudent to consider future avenues of investigation that could achieve this purpose. Certainly it would be almost impossible to create a single scientific study that would definitively address the question of the superiority of either implants or natural teeth as a means to support prostheses. Instead, it may be more prudent to realize that a series of investigations could be used to address this question. In that event, clinicians would benefit from consistent reporting of observed outcomes. The routine use of life tables with outcomes reported on an annual basis would make the task of data compilation much easier. In this situation, an individual could compile data from published research, thereby creating a low living low-level systematic review. Likewise, comparison of studies that use this method of data reporting would be a simpler process. The average clinician could create

spreadsheets that included pertinent references and data extracted from those references to be used in clinical practice. This recommendation alone would, if followed, provide the basis for a future systematic review that could provide definitive answers to the questions posed.

It is also important to understand that the information that was available in the scientific literature primarily related to survival of implants, teeth, or prostheses. There are a number of other complications that can occur but are not routinely reported. Material fracture or wear; biologic complications such as dental caries, gingivitis, or periodontitis; tooth or implant fracture; loss of retention; and cosmetic dissatisfaction should all be reported. Should future reports include this information, the literature will convey a much better understanding of the factors that influence treatment outcomes. Likewise, this information could be shared with patients to establish a truly informed consent.

Other suggestions to authors and editors are that future studies should include a minimum of follow-up time of 1 year for the majority of implants in the study. When comparative studies are performed, a sufficient number of subjects must be enrolled in each study arm to allow meaningful comparisons. Failure to populate studies with adequate numbers of subjects in each study arm results in insignificant differences even when clinical observations differ. Although statistical methods such as the Kaplan-Meier survival curves provide the probability of survival at specific timepoints, these methods of analysis do not lend themselves well to data extraction when systematic reviews are conducted. For this reason, it may be prudent for authors to include life tables along with Kaplan-Meier curves in future publications. Including both approaches to data analysis will facilitate future data extraction. In addition, when studies are underpopulated, data from the underpopulated study will be readily extracted for inclusion in larger synthesized studies.

Since the results of this systematic review demonstrated that most implant designs perform within 5% of each other, comparative studies of different implants designed to compare survival differences are unlikely to succeed in this regard, unless there are hundreds of implants in each study arm. If implant and prosthetic success are the compared outcomes, the study populations may not need to be as large.

It is the goal of this report to make suggestions which will allow future analyses to encompass more meaningful data at multiple timepoints. Inclusion of the parameters of absolute failure (ie, the causes for retreatment) is essential for meaningful data analyses. Likewise, general categories of complications would be valuable for the clinician. Descriptions of need for retreatment—prosthetic material failure (restorative material failure, connector failure, component failure), implant failure (loss of integration or fracture), esthetic failure (eg, shade, contour, position), implant angulation, soft tissue or inadequacy, or bone loss—need to be categorized appropriately. Likewise, there can be complications in each of these areas that do not require retreatment but do require additional treatment to maintain, repair, or correct a problem/complication.

It is hoped that future analyses can incorporate more in-depth data to arrive at multiple timepoint conclusions and predict the behavior of implant- and tooth-supported restorations.

CONCLUSION

This systematic review of the scientific literature failed to demonstrate any direct comparative studies assessing clinical performance of single ISC and FPDs. The study suggests differences at 60 months between survival of ISCs and FPDs when resin-bonded and conventionally retained fixed prostheses were grouped. This difference disappeared when ISCs were compared with conventionally retained FPDs at 60 months. For other time periods, direct comparative data were unavailable.

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REFERENCES

1. Lindh T, Gunne J, Tillberg A, Molin M. A meta-analysis of implants in partial edentulism. Clin Oral Implants Res 1998;9:80–90.
2. Creugers NH, Kreulen CM, Snoek PA, de Kanter RJ. A systematic review of single-tooth restorations supported by implants. J Dent 2000;28:209–217.
3. Goodacre CJ, Bernal G, Rungcharassaeng K, Kan JY. Clinical complications with implants and implant prostheses. J Prosthet Dent 2003;90:121–132.
4. Scurria MS, Bader JD, Shugars DA. Meta-analysis of fixed partial denture survival: Prostheses and abutments. J Prosthet Dent 1998;79:459–464.
5. Tan K, Pjetursson BE, Lang NP, Chan ES. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. Clin Oral Implants Res 2004;15:654–666.

6. Creugers NH, Kayser AF, van 't Hof MA. A meta-analysis of durability data on conventional fixed bridges. Community Dent Oral Epidemiol 1994;22:448–452.
7. Creugers NH, van 't Hof MA. An analysis of clinical studies on resin-bonded bridges. J Dent Res 1991;70:146–149.
8. Kristman VL, Manno M, Cote P. Methods to account for attrition in longitudinal data: Do they work? A simulation study. Eur J Epidemiol 2005;20:657–662.
9. Newcombe RG. Two-sided confidence intervals for the single proportion: Comparison of seven methods. Stat Med 1998;17:857–872.
10. Brown LD, Cai TT, Dasgupta A. Interval estimation for a binomial proportion. Stat Sci 2001;16:101–133.
11. Bohning D, Malzahn U, Dietz E, Schlattmann P, Viwatwongkasem C, Biggeri A. Some general points in estimating heterogeneity variance with the DerSimonian-Laird estimator. Biostatistics 2002;3:445–457.
12. Zhou XH, Brizendine EJ, Pritz MB. Methods for combining rates from several studies. Stat Med 1999;18:557–566.
13. Abboud M, Koeck B, Stark H, Wahl G, Paillon R. Immediate loading of single-tooth implants in the posterior region. Int J Oral Maxillofac Implants 2005;20:61–68.
14. Andersen E, Saxegaard E, Knutsen BM, Haanaes HR. A prospective clinical study evaluating the safety and effectiveness of narrow-diameter threaded implants in the anterior region of the maxilla. Int J Oral Maxillofac Implants 2001;16:217–224.
15. Andersen E, Haanaes HR, Knutsen BM. Immediate loading of single-tooth ITI implants in the anterior maxilla: A prospective 5-year pilot study. Clin Oral Implants Res 2002;13:281–287.
16. Andersson B. Implants for single-tooth replacement. A clinical and experimental study on the Brånemark CeraOne System. Swed Dent J Suppl 1995;108:1–41.
17. Andersson B, Odman P, Lindvall AM, Brånemark PI. Surgical and prosthodontic training of general practitioners for single tooth implants: A study of treatments performed at four general practitioners' offices and at a specialist clinic after 2 years. J Oral Rehabil 1995;22:543–548.
18. Andersson B, Odman P, Lindvall AM, Brånemark PI. Cemented single crowns on osseointegrated implants after 5 years: Results from a prospective study on CeraOne. Int J Prosthodont 1998;11:212–218.
19. Andersson B, Odman P, Lindvall AM, Brånemark PI. Five-year prospective study of prosthodontic and surgical single-tooth implant treatment in general practices and at a specialist clinic. Int J Prosthodont 1998;11:351–355.
20. Andersson B, Taylor A, Lang BR, et al. Alumina ceramic implant abutments used for single-tooth replacement: A prospective 1- to 3-year multicenter study. Int J Prosthodont 2001;14:432–438.
21. Andersson L, Emami-Kristiansen Z, Hogstrom J. Single-tooth implant treatment in the anterior region of the maxilla for treatment of tooth loss after trauma: A retrospective clinical and interview study. Dent Traumatol 2003;19:126–131.
22. Avivi-Arber L, Zarb GA. Clinical effectiveness of implant-supported single-tooth replacement: The Toronto Study. Int J Oral Maxillofac Implants 1996;11:311–321.
23. Balshi TJ, Hernandez RE, Pryszlak MC, Rangert B. A comparative study of one implant versus two replacing a single molar. Int J Oral Maxillofac Implants 1996;11:372–378.
24. Bambini F, Lo Muzio L, Procaccini M. Retrospective analysis of the influence of abutment structure design on the success of implant unit. A 3-year controlled follow-up study. Clin Oral Implants Res 2001;12:319–324.
25. Becker W, Becker BE. Replacement of maxillary and mandibular molars with single endosseous implant restorations: A retrospective study. J Prosthet Dent 1995;74:51–55.
26. Becker W, Becker BE, Alsuwyed A, Al-Mubarak S. Long-term evaluation of 282 implants in maxillary and mandibular molar positions: A prospective study. J Periodontol 1999;70:896–901.
27. Behneke A, Behneke N, d'Hoedt B, Wagner W. Hard and soft tissue reactions to ITI screw implants: 3-year longitudinal results of a prospective study. Int J Oral Maxillofac Implants 1997;12:749–757.
28. Bender MF. Posterior implant-supported single crowns: A new treatment approach [in German]. Int J Dent Symp 1994;2:65–69.
29. Bianchi AE, Sanfilippo F. Single-tooth replacement by immediate implant and connective tissue graft: A 1–9-year clinical evaluation. Clin Oral Implants Res 2004;15:269–277.
30. Bianco G, Di Raimondo R, Luongo G, et al. Osseointegrated implant for single-tooth replacement: A retrospective multicenter study on routine use in private practice. Clin Implant Dent Relat Res 2000;2:152–158.
31. Brocard D, Barthet P, Baysse E, et al. A multicenter report on 1,022 consecutively placed ITI implants: A 7-year longitudinal study. Int J Oral Maxillofac Implants 2000;15:691–700.
32. Calandriello R, Tomatis M, Vallone R, Rangert B, Gottlow J. Immediate occlusal loading of single lower molars using Brånemark System Wide-Platform TiUnite implants: An interim report of a prospective open-ended clinical multicenter study. Clin Implant Dent Relat Res 2003;5(suppl 1):74–80.
33. Callan D, Hahn J, Hebel K, et al. Retrospective multicenter study of an anodized, tapered, diminishing thread implant: Success rate at exposure. Implant Dent 2000;9:329–336.
34. Carlson B, Carlsson GE. Prosthodontic complications in osseointegrated dental implant treatment. Int J Oral Maxillofac Implants 1994;9:90–94.
35. Carr AB, Choi YG, Eckert SE, Desjardins RP. Retrospective cohort study of the clinical performance of 1-stage dental implants. Int J Oral Maxillofac Implants 2003;18:399–405.
36. Carter GM, Hunter KM. Implant-based treatment for the loss of a single tooth. N Z Dent J 1994;90:150–156.
37. Carter GM, Hunter KM. Six years' experience with Brånemark osseointegrated implants. N Z Dent J 1995;91:44–48.
38. Chang M, Odman PA, Wennstrom JL, Andersson B. Esthetic outcome of implant-supported single-tooth replacements assessed by the patient and by prosthodontists. Int J Prosthodont 1999;12:335–341.
39. Chang M, Wennstrom JL, Odman P, Andersson B. Implant supported single-tooth replacements compared to contralateral natural teeth. Crown and soft tissue dimensions. Clin Oral Implants Res 1999;10:185–194.
40. Chaushu G, Chaushu S, Tzohar A, Dayan D. Immediate loading of single-tooth implants: Immediate versus non-immediate implantation. A clinical report. Int J Oral Maxillofac Implants 2001;16:267–272.
41. Choquet V, Hermans M, Adriaenssens P, Daelemans P, Tarnow DP, Malevez C. Clinical and radiographic evaluation of the papilla level adjacent to single-tooth dental implants. A retrospective study in the maxillary anterior region. J Periodontol 2001;72:1364–1371.
42. Cooper L, Felton DA, Kugelberg CF, et al. A multicenter 12-month evaluation of single-tooth implants restored 3 weeks after 1-stage surgery. Int J Oral Maxillofac Implants 2001;16:182–192.
43. Cordioli G, Castagna S, Consolati E. Single-tooth implant rehabilitation: A retrospective study of 67 implants. Int J Prosthodont 1994;7:525–531.
44. Creugers NH, Kreulen CM. Systematic review of 10 years of systematic reviews in prosthodontics. Int J Prosthodont 2003;16:123–127.

45. Cune MS, van Rossen IP, de Putter C, Wils RP. A clinical retrospective evaluation of FA/HA coated (Biocomp) dental implants. Results after 1 year. Clin Oral Implants Res 1996;7:345–353.
46. Cune MS, de Putter C, Vos A, Wils RP. Clinical evaluation of the Biocomp-implant system. Results after 1, 3 and 5 years in a general practice [in Dutch]. Ned Tijdschr Tandheelkd 2001;108:5–10.
47. Davarpanah M, Martinez H, Etienne D, et al. A prospective multicenter evaluation of 1,583 3i implants: 1- to 5-year data. Int J Oral Maxillofac Implants 2002;17:820–828.
48. de Wijs FL, Cune MS, van Rossen IP, de Putter C. Delayed implants in the anterior maxilla with the IMZ-implant system: A radiographical evaluation. J Oral Rehabil 1995;22:797–802.
49. de Wijs FL, Cune MS. Immediate labial contour restoration for improved esthetics: A radiographic study on bone splitting in anterior single-tooth replacement. Int J Oral Maxillofac Implants 1997;12:686–696.
50. Degidi M, Piattelli A. Immediate functional and non-functional loading of dental implants: A 2- to 60-month follow-up study of 646 titanium implants. J Periodontol 2003;74:225–241.
51. Degidi M, Piattelli A. Comparative analysis study of 702 dental implants subjected to immediate functional loading and immediate nonfunctional loading to traditional healing periods with a follow-up of up to 24 months. Int J Oral Maxillofac Implants 2005;20:99–107.
52. Deporter DA, Todescan R, Watson PA, Pharoah M, Levy D, Nardini K. Use of the Endopore dental implant to restore single teeth in the maxilla: Protocol and early results. Int J Oral Maxillofac Implants 1998;13:263–272.
53. Deporter D, Pilliar RM, Todescan R, Watson P, Pharoah M. Managing the posterior mandible of partially edentulous patients with short, porous-surfaced dental implants: Early data from a clinical trial. Int J Oral Maxillofac Implants 2001;16:653–658.
54. Duncan JP, Nazarova E, Vogiatzi T, Taylor TD. Prosthodontic complications in a prospective clinical trial of single-stage implants at 36 months. Int J Oral Maxillofac Implants 2003;18:561–565.
55. Ekfeldt A, Carlsson GE, Borjesson G. Clinical evaluation of single-tooth restorations supported by osseointegrated implants: A retrospective study. Int J Oral Maxillofac Implants 1994;9:179–183.
56. el-Far MM. Tissue reaction at osseointegrated single implants with self-holding tapers abutments. A preliminary report of 45 Bicon Implants. Egypt Dent J 1995;41:1429–1434.
57. Engquist B, Nilson H, Astrand P. Single-tooth replacement by osseointegrated Brånemark implants. A retrospective study of 82 implants. Clin Oral Implants Res 1995;6:238–245.
58. Ericsson I, Nilson H, Lindh T, Nilner K, Randow K. Immediate functional loading of Brånemark single tooth implants. An 18 months' clinical pilot follow-up study. Clin Oral Implants Res 2000;11:26–33.
59. Esposito M, Ekestubbe A, Grondahl K. Radiological evaluation of marginal bone loss at tooth surfaces facing single Brånemark implants. Clin Oral Implants Res 1993;4:151–157.
60. Evian CI, Emling R, Rosenberg ES, et al. Retrospective analysis of implant survival and the influence of periodontal disease and immediate placement on long-term results. Int J Oral Maxillofac Implants 2004;19:393–398.
61. Fugazzotto PA, Gulbransen HJ, Wheeler SL, Lindsay JA. The use of IMZ osseointegrated implants in partially and completely edentulous patients: Success and failure rates of 2,023 implant cylinders up to 60+ months in function. Int J Oral Maxillofac Implants 1993;8:617–621.
62. Fugazzotto PA, Beagle JR, Ganeles J, Jaffin R, Vlassis J, Kumar A. Success and failure rates of 9 mm or shorter implants in the replacement of missing maxillary molars when restored with individual crowns: Preliminary results 0 to 84 months in function. A retrospective study. J Periodontol 2004;75:327–332.
63. Gaggl A, Schultes G, Karcher H. Vertical alveolar ridge distraction with prosthetic treatable distractors: A clinical investigation. Int J Oral Maxillofac Implants 2000;15:701–710.
64. Giannopoulou C, Bernard JP, Buser D, Carrel A, Belser UC. Effect of intracrevicular restoration margins on peri-implant health: Clinical, biochemical, and microbiologic findings around esthetic implants up to 9 years. Int J Oral Maxillofac Implants 2003;18:173–181.
65. Gibbard LL, Zarb G. A 5-year prospective study of implant-supported single-tooth replacements. J Can Dent Assoc 2002;68:110–116.
66. Glauser R, Ruhstaller P, Gottlow J, Sennerby L, Portmann M, Hammerle CH. Immediate occlusal loading of Brånemark TiUnite implants placed predominantly in soft bone: 1-year results of a prospective clinical study. Clin Implant Dent Relat Res 2003;5(suppl 1):47–56.
67. Glauser R, Sailer I, Wohlwend A, Studer S, Schibli M, Scharer P. Experimental zirconia abutments for implant-supported single-tooth restorations in esthetically demanding regions: 4-year results of a prospective clinical study. Int J Prosthodont 2004;17:285–290.
68. Goldstein M, Boyan BD, Schwartz Z. The palatal advanced flap: A pedicle flap for primary coverage of immediately placed implants. Clin Oral Implants Res 2002;13:644–650.
69. Gomez-Roman G, Kruppenbacher M, Weber H, Schulte W. Immediate postextraction implant placement with root-analog stepped implants: Surgical procedure and statistical outcome after 6 years. Int J Oral Maxillofac Implants 2001;16:503–513.
70. Groisman M, Ferreira HM, Frossard WM, de Menezes Filho LM, Harari ND. Clinical evaluation of hydroxyapatite-coated single-tooth implants: A 5-year retrospective study. Pract Proced Aesthet Dent 2001;13:355–360.
71. Groisman M, Frossard WM, Ferreira HM, de Menezes Filho LM, Touati B. Single-tooth implants in the maxillary incisor region with immediate provisionalization: 2-year prospective study. Pract Proced Aesthet Dent 2003;15:115–122, 124.
72. Grunder U, Gaberthuel T, Boitel N, et al. Evaluating the clinical performance of the Osseotite implant: Defining prosthetic predictability. Compend Contin Educ Dent 1999;20:628–633, 636, 638–640.
73. Grunder U. Stability of the mucosal topography around single-tooth implants and adjacent teeth: 1-year results. Int J Periodontics Restorative Dent 2000;20:11–17.
74. Haas R, Polak C, Furhauser R, Mailath-Pokorny G, Dortbudak O, Watzek G. A long-term follow-up of 76 Brånemark single-tooth implants. Clin Oral Implants Res 2002;13:38–43.
75. Henry PJ, Rosenberg IR, Bills IG, et al. Osseointegrated implants for single tooth replacement in general practice: A 1-year report from a multicentre prospective study. Aust Dent J 1995;40:173–181.
76. Henry PJ, Laney WR, Jemt T, et al. Osseointegrated implants for single-tooth replacement: A prospective 5-year multicenter study. Int J Oral Maxillofac Implants 1996;11:450–455.
77. Huys LW. Replacement therapy and the immediate post-extraction dental implant. Implant Dent 2001;10:93–102.
78. Jemt T, Lekholm U, Grondahl K. 3-year follow-up study of early single implant restorations ad modum Brånemark. Int J Periodontics Restorative Dent 1990;10:340–349.

79. Jemt T, Laney WR, Harris D, et al. Osseointegrated implants for single tooth replacement: A 1-year report from a multicenter prospective study. Int J Oral Maxillofac Implants 1991;6:29–36.
80. Jemt T, Pettersson P. A 3-year follow-up study on single implant treatment. J Dent 1993;21:203–208.
81. Jemt T. Customized titanium single-implant abutments: 2-year follow-up pilot study. Int J Prosthodont 1998;11:312–316.
82. Jemt T. Restoring the gingival contour by means of provisional resin crowns after single-implant treatment. Int J Periodontics Restorative Dent 1999;19:20–29.
83. Johnson RH, Persson GR. Evaluation of a single-tooth implant. Int J Oral Maxillofac Implants 2000;15:396–404.
84. Johnson RH, Persson GR. A 3-year prospective study of a single-tooth implant—Prosthodontic complications. Int J Prosthodont 2001;14:183–189.
85. Jorneus L, Jemt T, Carlsson L. Loads and designs of screw joints for single crowns supported by osseointegrated implants. Int J Oral Maxillofac Implants 1992;7:353–359.
86. Kan JY, Rungcharassaeng K, Lozada J. Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective study. Int J Oral Maxillofac Implants 2003;18:31–39.
87. Karlsson U, Gotfredsen K, Olsson C. Single-tooth replacement by osseointegrated Astra Tech dental implants: A 2-year report. Int J Prosthodont 1997;10:318–324.
88. Kemppainen P, Eskola S, Ylipaavalniemi P. A comparative prospective clinical study of two single-tooth implants: A preliminary report of 102 implants. J Prosthet Dent 1997;77:382–387.
89. Krennmair G, Schmidinger S, Waldenberger O. Single-tooth replacement with the Frialit-2 system: A retrospective clinical analysis of 146 implants. Int J Oral Maxillofac Implants 2002;17:78–85.
90. Kucey BK. Implant placement in prosthodontics practice: A five-year retrospective study. J Prosthet Dent 1997;77:171–176.
91. Lambrecht JT, Filippi A, Kunzel AR, Schiel HJ. Long-term evaluation of submerged and nonsubmerged ITI solid-screw titanium implants: A 10-year life table analysis of 468 implants. Int J Oral Maxillofac Implants 2003;18:826–834.
92. Laney WR, Jemt T, Harris D, et al. Osseointegrated implants for single-tooth replacement: Progress report from a multicenter prospective study after 3 years. Int J Oral Maxillofac Implants 1994;9:49–54.
93. Lazzara RJ, Porter SS, Testori T, Galante J, Zetterqvist L. A prospective multicenter study evaluating loading of osseotite implants two months after placement: One-year results. J Esthet Dent 1998;10:280–289.
94. Levine RA, Clem DS 3rd, Wilson TG Jr, Higginbottom F, Saunders SL. A multicenter retrospective analysis of the ITI implant system used for single-tooth replacements: Preliminary results at 6 or more months of loading. Int J Oral Maxillofac Implants 1997;12:237–242.
95. Levine RA, Clem DS 3rd, Wilson TG Jr, Higginbottom F, Solnit G. Multicenter retrospective analysis of the ITI implant system used for single-tooth replacements: Results of loading for 2 or more years. Int J Oral Maxillofac Implants 1999;14:516–520.
96. Levine RA, Clem D, Beagle J, et al. Multicenter retrospective analysis of the solid-screw ITI implant for posterior single-tooth replacements. Int J Oral Maxillofac Implants 2002;17:550–556.
97. Lew I, Maresca MJ, Greene D. A fifteen year report of a single tooth replacement system. J Oral Implantol 1979;8:534–552.
98. Lill W, Thornton B, Reichsthaler J, Schneider B. Statistical analyses on the success potential of osseointegrated implants: A retrospective single-dimension statistical analysis. J Prosthet Dent 1993;69:176–185.
99. Lindhe J, Berglundh T. The interface between the mucosa and the implant. Periodontol 2000 1998;17:47–54.
100. Lorenzoni M, Pertl C, Zhang K, Wimmer G, Wegscheider WA. Immediate loading of single-tooth implants in the anterior maxilla. Preliminary results after one year. Clin Oral Implants Res 2003;14:180–187.
101. Malevez C, Hermans M, Daelemans P. Marginal bone levels at Brånemark system implants used for single tooth restoration. The influence of implant design and anatomical region. Clin Oral Implants Res 1996;7:162–169.
102. Malmqvist JP, Sennerby L. Clinical report on the success of 47 consecutively placed Core-Vent implants followed from 3 months to 4 years. Int J Oral Maxillofac Implants 1990;5:53–60.
103. Malo P, Friberg B, Polizzi G, Gualini F, Vighagen T, Rangert B. Immediate and early function of Brånemark System implants placed in the esthetic zone: A 1-year prospective clinical multicenter study. Clin Implant Dent Relat Res 2003;5(suppl 1):37–46.
104. Mangano C, Bartolucci EG. Single tooth replacement by Morse taper connection implants: A retrospective study of 80 implants. Int J Oral Maxillofac Implants 2001;16:675–680.
105. Mau J. On statistics of success and loss for dental implants. Int Dent J 1993;43:254–261.
106. Mayer TM, Hawley CE, Gunsolley JC, Feldman S. The single-tooth implant: A viable alternative for single-tooth replacement. J Periodontol 2002;73:687–693.
107. Mazor Z, Peleg M, Gross M. Sinus augmentation for single-tooth replacement in the posterior maxilla: A 3-year follow-up clinical report. Int J Oral Maxillofac Implants 1999;14:55–60.
108. Mazor Z, Cohen DK. Preliminary 3-dimensional surface texture measurement and early loading results with a microtextured implant surface. Int J Oral Maxillofac Implants 2003;18:729–738.
109. McMillan AS, Allen PF, Bin Ismail I. A retrospective multicenter evaluation of single tooth implant experience at three centers in the United Kingdom. J Prosthet Dent 1998;79:410–414.
110. Mengel R, Stelzel M, Hasse C, Flores-de-Jacoby L. Osseointegrated implants in patients treated for generalized severe adult periodontitis. An interim report. J Periodontol 1996;67:782–787.
111. Mericske-Stern R, Aerni D, Geering AH, Buser D. Long-term evaluation of non-submerged hollow cylinder implants. Clinical and radiographic results. Clin Oral Implants Res 2001;12:252–259.
112. Moberg LE, Kondell PA, Kullman L, Heimdahl A, Gynther GW. Evaluation of single-tooth restorations on ITI dental implants. A prospective study of 29 patients. Clin Oral Implants Res 1999;10:45–53.
113. Morris HF, Ochi S. Influence of research center on overall survival outcomes at each phase of treatment. Ann Periodontol 2000;5:129–136.
114. Morris HF, Winkler S, Ochi S. A 48-month multicentric clinical investigation: Implant design and survival. J Oral Implantol 2001;27:180–186.
115. Muftu A, Chapman RJ. Replacing posterior teeth with free-standing implants: Four-year prosthodontic results of a prospective study. J Am Dent Assoc 1998;129:1097–1102.
116. Naert I, Koutsikakis G, Duyck J, Quirynen M, Jacobs R, van Steenberghe D. Biologic outcome of single-implant restorations as tooth replacements: A long-term follow-up study. Clin Implant Dent Relat Res 2000;2:209–218.
117. Naert I, Koutsikakis G, Duyck J, Quirynen M, Jacobs R, van Steenberghe D. Biologic outcome of implant-supported restorations in the treatment of partial edentulism. Part I: A longitudinal clinical evaluation. Clin Oral Implants Res 2002;13:381–389.

118. Naert I, Koutsikakis G, Quirynen M, Duyck J, van Steenberghe D, Jacobs R. Biologic outcome of implant-supported restorations in the treatment of partial edentulism. Part 2: A longitudinal radiographic study. Clin Oral Implants Res 2002;13:390–395.
119. Nedir R, Bischof M, Briaux JM, Beyer S, Szmukler-Moncler S, Bernard JP. A 7-year life table analysis from a prospective study on ITI implants with special emphasis on the use of short implants. Results from a private practice. Clin Oral Implants Res 2004;15:150–157.
120. Nentwig GH. Ankylos implant system: Concept and clinical application. J Oral Implantol 2004;30:171–177.
121. Nikellis I, Levi A, Nicolopoulos C. Immediate loading of 190 endosseous dental implants: A prospective observational study of 40 patient treatments with up to 2-year data. Int J Oral Maxillofac Implants 2004;19:116–123.
122. Nkenke E, Radespiel-Troger M, Wiltfang J, Schultze-Mosgau S, Winkler G, Neukam FW. Morbidity of harvesting of retromolar bone grafts: A prospective study. Clin Oral Implants Res 2002;13:514–521.
123. Noack N, Willer J, Hoffmann J. Long-term results after placement of dental implants: Longitudinal study of 1,964 implants over 16 years. Int J Oral Maxillofac Implants 1999;14:748–755.
124. Norton MR. The Astra Tech Single-Tooth Implant System: A report on 27 consecutively placed and restored implants. Int J Periodontics Restorative Dent 1997;17:574–583.
125. Norton MR. Marginal bone levels at single tooth implants with a conical fixture design. The influence of surface macro- and microstructure. Clin Oral Implants Res 1998;9:91–99.
126. Norton MR. Single-tooth implant-supported restorations. Planning for an aesthetic and functional solution. Dent Update 2001;28:170–175.
127. Norton MR. A short-term clinical evaluation of immediately restored maxillary TiOblast single-tooth implants. Int J Oral Maxillofac Implants 2004;19:274–281.
128. Oates TW, West J, Jones J, Kaiser D, Cochran DL. Long-term changes in soft tissue height on the facial surface of dental implants. Implant Dent 2002;11:272–279.
129. Orenstein IH, Petrazzuolo V, Morris HF, Ochi S. Variables affecting survival of single-tooth hydroxyapatite-coated implants in anterior maxillae at 3 years. Ann Periodontol 2000;5:68–78.
130. Palmer RM, Smith BJ, Palmer PJ, Floyd PD. A prospective study of Astra single tooth implants. Clin Oral Implants Res 1997;8:173–179.
131. Palmer RM, Palmer PJ, Smith BJ. A 5-year prospective study of Astra single tooth implants. Clin Oral Implants Res 2000;11:179–182.
132. Parein AM, Eckert SE, Wollan PC, Keller EE. Implant reconstruction in the posterior mandible: A long-term retrospective study. J Prosthet Dent 1997;78:34–42.
133. Polizzi G, Fabbro S, Furri M, Herrmann I, Squarzoni S. Clinical application of narrow Brånemark System implants for single-tooth restorations. Int J Oral Maxillofac Implants 1999;14:496–503.
134. Polizzi G, Rangert B, Lekholm U, Gualini F, Lindstrom H. Brånemark System Wide Platform implants for single molar replacement: Clinical evaluation of prospective and retrospective materials. Clin Implant Dent Relat Res 2000;2:61–69.
135. Preiskel HW, Tsolka P. The DIA anatomic abutment system and telescopic prostheses: A clinical report. Int J Oral Maxillofac Implants 1997;12:628–633.
136. Priest G. Single-tooth implants and their role in preserving remaining teeth: A 10-year survival study. Int J Oral Maxillofac Implants 1999;14:181–188.
137. Priest G. Predictability of soft tissue form around single-tooth implant restorations. Int J Periodontics Restorative Dent 2003;23:19–27.
138. Proussaefs P, Kan J, Lozada J, Kleinman A, Farnos A. Effects of immediate loading with threaded hydroxyapatite-coated root-form implants on single premolar replacements: A preliminary report. Int J Oral Maxillofac Implants 2002;17:567–572.
139. Proussaefs P, Lozada J. Immediate loading of hydroxyapatite-coated implants in the maxillary premolar area: Three-year results of a pilot study. J Prosthet Dent 2004;91:228–233.
140. Puchades-Roman L, Palmer RM, Palmer PJ, Howe LC, Ide M, Wilson RF. A clinical, radiographic, and microbiologic comparison of Astra Tech and Brånemark single tooth implants. Clin Implant Dent Relat Res 2000;2:78–84.
141. Raghoebar GM, Batenburg RH, Vissink A, Reintsema H. Augmentation of localized defects of the anterior maxillary ridge with autogenous bone before insertion of implants. J Oral Maxillofac Surg 1996;54:1180–1185.
142. Rocci A, Martignoni M, Gottlow J. Immediate loading in the maxilla using flapless surgery, implants placed in predetermined positions, and prefabricated provisional restorations: A retrospective 3-year clinical study. Clin Implant Dent Relat Res 2003;5(suppl 1):29–36.
143. Rodriguez AM, Orenstein IH, Morris HF, Ochi S. Survival of various implant-supported prosthesis designs following 36 months of clinical function. Ann Periodontol 2000;5:101–108.
144. Romanos GE, Nentwig GH. Single molar replacement with a progressive thread design implant system: A retrospective clinical report. Int J Oral Maxillofac Implants 2000;15:831–836.
145. Romeo E, Chiapasco M, Ghisolfi M, Vogel G. Long-term clinical effectiveness of oral implants in the treatment of partial edentulism. Seven-year life table analysis of a prospective study with ITI dental implants system used for single-tooth restorations. Clin Oral Implants Res 2002;13:133–143.
146. Romeo E, Lops D, Margutti E, Ghisolfi M, Chiapasco M, Vogel G. Long-term survival and success of oral implants in the treatment of full and partial arches: A 7-year prospective study with the ITI dental implant system. Int J Oral Maxillofac Implants 2004;19:247–259.
147. Saadoun AP, Le Gall MG. An 8-year compilation of clinical results obtained with Steri-Oss endosseous implants. Compend Contin Educ Dent 1996;17:669–674.
148. Salonen MA, Oikarinen K, Virtanen K, Pernu H. Failures in the osseointegration of endosseous implants. Int J Oral Maxillofac Implants 1993;8:92–97.
149. Salvi GE, Gallini G, Lang NP. Early loading (2 or 6 weeks) of sandblasted and acid-etched (SLA) ITI implants in the posterior mandible. A 1-year randomized controlled clinical trial. Clin Oral Implants Res 2004;15:142–149.
150. Scheller H, Urgell JP, Kultje C, et al. A 5-year multicenter study on implant-supported single crown restorations. Int J Oral Maxillofac Implants 1998;13:212–218.
151. Schmitt A, Zarb GA. The longitudinal clinical effectiveness of osseointegrated dental implants for single-tooth replacement. Int J Prosthodont 1993;6:197–202.
152. Scholander S. A retrospective evaluation of 259 single-tooth replacements by the use of Brånemark implants. Int J Prosthodont 1999;12:483–491.
153. Schwartz-Arad D, Samet N. Single tooth replacement of missing molars: A retrospective study of 78 implants. J Periodontol 1999;70:449–454.
154. Schwartz-Arad D, Grossman Y, Chaushu G. The clinical effectiveness of implants placed immediately into fresh extraction sites of molar teeth. J Periodontol 2000;71:839–844.

155. Scipioni A, Bruschi GB, Calesini G. The edentulous ridge expansion technique: A five-year study. Int J Periodontics Restorative Dent 1994;14:451–459.
156. Sethi A, Kaus T. Maxillary ridge expansion with simultaneous implant placement: 5-year results of an ongoing clinical study. Int J Oral Maxillofac Implants 2000;15:491–499.
157. Sethi A, Kaus T, Sochor P. The use of angulated abutments in implant dentistry: Five-year clinical results of an ongoing prospective study. Int J Oral Maxillofac Implants 2000;15:801–810.
158. Sethi A, Sochor P. The lateral fixation screw in implant dentistry. Eur J Prosthodont Restor Dent 2000;8:39–43.
159. Simon RL. Single implant-supported molar and premolar crowns: A ten-year retrospective clinical report. J Prosthet Dent 2003;90:517–521.
160. Singer A, Serfaty V. Cement-retained implant-supported fixed partial dentures: A 6-month to 3-year follow-up. Int J Oral Maxillofac Implants 1996;11:645–659.
161. Steveling H, Roos J, Rasmusson L. Maxillary implants loaded at 3 months after insertion: Results with Astra Tech implants after up to 5 years. Clin Implant Dent Relat Res 2001;3:120–124.
162. Stricker A, Voss PJ, Gutwald R, Schramm A, Schmelzeisen R. Maxillary sinus floor augmentation with autogenous bone grafts to enable placement of SLA-surfaced implants: Preliminary results after 15–40 months. Clin Oral Implants Res 2003;14:207–212.
163. Sullivan DY, Sherwood RL, Mai TN. Preliminary results of a multicenter study evaluating a chemically enhanced surface for machined commercially pure titanium implants. J Prosthet Dent 1997;78:379–386 [erratum 1998;79:365].
164. Sullivan DY, Sherwood RL, Porter SS. Long-term performance of Osseotite implants: A 6-year clinical follow-up. Compend Contin Educ Dent 2001;22:326–328, 330, 332–334.
165. Sulzer TH, Bornstein MM, Buser D. Indications for oral implantology in a referral clinic. A three-year retrospective analysis of 737 patients with 1176 implants [in German]. Schweiz Monatsschr Zahnmed 2004;114:444–450.
166. Testori T, Wiseman L, Woolfe S, Porter SS. A prospective multicenter clinical study of the Osseotite implant: Four-year interim report. Int J Oral Maxillofac Implants 2001;16:193–200.
167. Testori T, Del Fabbro M, Feldman S, et al. A multicenter prospective evaluation of 2-months loaded Osseotite implants placed in the posterior jaws: 3-year follow-up results. Clin Oral Implants Res 2002;13:154–161.
168. Thilander B, Odman J, Jemt T. Single implants in the upper incisor region and their relationship to the adjacent teeth. An 8-year follow-up study. Clin Oral Implants Res 1999;10:346–355.
169. Thilander B, Odman J, Lekholm U. Orthodontic aspects of the use of oral implants in adolescents: A 10-year follow-up study. Eur J Orthod 2001;23:715–731.
170. Vermylen K, Collaert B, Linden U, Bjorn AL, De Bruyn H. Patient satisfaction and quality of single-tooth restorations. Clin Oral Implants Res 2003;14:119–124.
171. Vigolo P, Givani A. Clinical evaluation of single-tooth mini-implant restorations: A five-year retrospective study. J Prosthet Dent 2000;84:50–54.
172. Vigolo P, Givani A, Majzoub Z, Cordioli G. Cemented versus screw-retained implant-supported single-tooth crowns: A 4-year prospective clinical study. Int J Oral Maxillofac Implants 2004;19:260–265.
173. Walther W, Klemke J, Worle M, Heners M. Implant-supported single-tooth replacements: Risk of implant and prosthesis failure. J Oral Implantol 1996;22:236–239.
174. Wannfors K, Smedberg JI. A prospective clinical evaluation of different single-tooth restoration designs on osseointegrated implants. A 3-year follow-up of Brånemark implants. Clin Oral Implants Res 1999;10:453–458.
175. Watson CJ, Tinsley D, Ogden AR, Russell JL, Mulay S, Davison EM. A 3 to 4 year study of single tooth hydroxyapatite coated endosseous dental implants. Br Dent J 1999;187:90–94.
176. Wennstrom JL, Ekestubbe A, Grondahl K, Karlsson S, Lindhe J. Implant-supported single-tooth restorations: A 5-year prospective study. J Clin Periodontol 2005;32:567–574.
177. Watson CJ, Tinsley D, Sharma S. Implant complications and failures: The single-tooth restoration. Dent Update 2000;27:35–38, 40, 42.
178. Weber HP, Buser D, Fiorellini JP, Williams RC. Radiographic evaluation of crestal bone levels adjacent to nonsubmerged titanium implants. Clin Oral Implants Res 1992;3:181–188.
179. Weng D, Jacobson Z, Tarnow D, et al. A prospective multicenter clinical trial of 3i machined-surface implants: Results after 6 years of follow-up. Int J Oral Maxillofac Implants 2003;18:417–423.
180. Widmark G, Friberg B, Johansson B, Sindet-Pedersen S, Taylor A. Mk III: A third generation of the self-tapping Brånemark System implant, including the new Stargrip internal grip design. A 1-year prospective four-center study. Clin Implant Dent Relat Res 2003;5:273–279.
181. Wohrle PS. Single-tooth replacement in the aesthetic zone with immediate provisionalization: Fourteen consecutive case reports. Pract Periodontics Aesthet Dent 1998;10:1107–1114.
182. Yi SW, Ericsson I, Kim CK, Carlsson GE, Nilner K. Implant-supported fixed prostheses for the rehabilitation of periodontally compromised dentitions: A 3-year prospective clinical study. Clin Implant Dent Relat Res 2001;3:125–134.
183. Zinsli B, Sagesser T, Mericske E, Mericske-Stern R. Clinical evaluation of small-diameter ITI implants: A prospective study. Int J Oral Maxillofac Implants 2004;19:92–99.
184. Covani U, Bortolaia C, Barone A, Sbordone L. Bucco-lingual crestal bone changes after immediate and delayed implant placement. J Periodontol 2004;75:1605–1612.
185. Davis DM, Watson RM, Packer ME. Single tooth crowns supported on hydroxyapatite coated endosseous dental implants: A prospective 5-year study on twenty subjects. Int Dent J 2004;54:201–205.
186. Gotfredsen K. A 5-year prospective study of single-tooth replacements supported by the Astra Tech implant: A pilot study. Clin Implant Dent Relat Res 2004;6:1–8.
187. Altieri JV, Burstone CJ, Goldberg AJ, Patel AP. Longitudinal clinical evaluation of fiber-reinforced composite fixed partial dentures: A pilot study. J Prosthet Dent 1994;71:16–22.
188. Andersson B, Glauser R, Maglione M, Taylor A. Ceramic implant abutments for short-span FPDs: A prospective 5-year multicenter study. Int J Prosthodont 2003;16:640–646.
189. Andersson B, Scharer P, Simion M, Bergstrom C. Ceramic implant abutments used for short-span fixed partial dentures: A prospective 2-year multicenter study. Int J Prosthodont 1999;12:318–324.
190. Aparicio C, Perales P, Rangert B. Tilted implants as an alternative to maxillary sinus grafting: A clinical, radiologic, and periotest study. Clin Implant Dent Relat Res 2001;3:39–49.
191. Aquilino SA, Shugars DA, Bader JD, White BA. Ten-year survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. J Prosthet Dent 2001;85:455–460.
192. Assemat-Tessandier X. Bonded bridges. Clinical application of the Maryland bridge for the restoration of posterior edentulousness [in French]. Inf Dent 1986;68:2317–2326.

193. Astrand P, Engquist B, Anzen B, et al. Nonsubmerged and submerged implants in the treatment of the partially edentulous maxilla. Clin Implant Dent Relat Res 2002;4:115–127.
194. Attard NJ, Zarb GA. Implant prosthodontic management of partially edentulous patients missing posterior teeth: The Toronto experience. J Prosthet Dent 2003;89:352–359.
195. Aydin MY, Kargul B. Glass-fiber reinforced composite in management of avulsed central incisor: A case report. J Dent Child (Chic) 2004;71:66–68.
196. Barrack G. Aesthetic partial-coverage dental restorations. Curr Opin Dent 1992;2:39–44.
197. Barrack G. The etched cast restoration—Clinical techniques and long-term results. Quintessence Int 1993;24:701–713.
198. Barrack G, Bretz WA. A long-term prospective study of the etched-cast restoration. Int J Prosthodont 1993;6:428–434.
199. Bassett JL. Replacement of missing mandibular lateral incisors with a single pontic all-ceramic prosthesis: A case report. Pract Periodontics Aesthet Dent 1997;9:455–461.
200. Behr M, Leibrock A, Stich W, Rammelsberg P, Rosentritt M, Handel G. Adhesive-fixed partial dentures in anterior and posterior areas. Results of an on-going prospective study begun in 1985. Clin Oral Investig 1998;2:31–35.
201. Behr M, Rosentritt M, Handel G. Fiber-reinforced composite crowns and FPDs: A clinical report. Int J Prosthodont 2003;16:239–243.
202. Berekally TL. Post-insertion sensitivity with a bonded etched cast metal prosthesis. Case report. Aust Dent J 1990;35:413–415.
203. Berekally TL, Makinson OF, Pietrobon RA. A microscopic examination of bond surfaces in failed electrolytically etched cast metal fixed prostheses. Aust Dent J 1993;38:229–235.
204. Berekally TL, Smales RJ. A retrospective clinical evaluation of resin-bonded bridges inserted at the Adelaide Dental Hospital. Aust Dent J 1993;38:85–96.
205. Berger RJ. The Maryland bridge signals a "new era" in restorative dentistry. NADL J 1982;29:11–13.
206. Bertelli E, Luzi P, Boracchini A, Ferrari M, Sforza V. Scanning electron microscopic findings on metal etching for a Maryland Bridge (1) [in Italian]. Minerva Stomatol 1985;34:519–525.
207. Bertelli E, Luzi P, Borracchini A, Ferrari M, Sforza V. Scanning electron microscopy of the metal etching for the Maryland bridge. II [in Italian]. Minerva Stomatol 1986;35:731–737.
208. Besimo C. Resin-bonded fixed partial denture technique: Results of a medium-term clinical follow-up investigation. J Prosthet Dent 1993;69:144–148.
209. Besimo C, Gachter M, Jahn M, Hassell T. Clinical performance of resin-bonded fixed partial dentures and extracoronal attachments for removable prostheses. J Prosthet Dent 1997;78:465–471.
210. Black SM, Charlton G. Survival of crowns and bridges related to luting cements. Restorative Dent 1990;6:26–30.
211. Blatz MB. Long-term clinical success of all-ceramic posterior restorations. Quintessence Int 2002;33:415–426.
212. Block MS, Lirette D, Gardiner D, et al. Prospective evaluation of implants connected to teeth. Int J Oral Maxillofac Implants 2002;17:473–487.
213. Boening KW. Clinical performance of resin-bonded fixed partial dentures. J Prosthet Dent 1996;76:39–44.
214. Bohlsen F, Kern M. Clinical outcome of glass-fiber-reinforced crowns and fixed partial dentures: A three-year retrospective study. Quintessence Int 2003;34:493–496.
215. Botelho MG, Chan AW, Yiu EY, Tse ET. Longevity of two-unit cantilevered resin-bonded fixed partial dentures. Am J Dent 2002;15:295–299.
216. Botelho MG, Nor LC, Kwong HW, Kuen BS. Two-unit cantilevered resin-bonded fixed partial dentures—A retrospective, preliminary clinical investigation. Int J Prosthodont 2000;13:25–28.
217. Bourrelly MG. A bonded bridge using the University of Maryland technic [in French]. Rev Fr Prothes Dent 1984;(47):47–52.
218. Brooks JW, Twyman B, Wilcox E, Peters M. The Maryland bridge: Is it here to stay? Dent Lab Rev 1983;58:16, 18–19.
219. Budtz-Jorgensen E. Restoration of the partially edentulous mouth—A comparison of overdentures, removable partial dentures, fixed partial dentures and implant treatment. J Dent 1996;24:237–244.
220. Budtz-Jorgensen E, Isidor F. A 5-year longitudinal study of cantilevered fixed partial dentures compared with removable partial dentures in a geriatric population. J Prosthet Dent 1990;64:42–47.
221. Budtz-Jorgensen E, Isidor F, Karring T. Cantilevered fixed partial dentures in a geriatric population: Preliminary report. J Prosthet Dent 1985;54:467–473.
222. Buhler H. Evaluation of root-resected teeth. Results after 10 years. J Periodontol 1988;59:805–810.
223. Burgess JO, McCartney JG. Anterior retainer design for resin-bonded acid-etched fixed partial dentures. J Prosthet Dent 1989;61:433–436.
224. Burke TA, Litt JS, Fox MA. Linking public health and the health of the Chesapeake Bay. Environ Res 2000;82:143–149.
225. Butler BR. The Maryland bridge: Lifting large resin patterns. Quintessence Dent Technol 1984;8:373–375.
226. Cagidiaco D, Ferrari M, Cagidiaco MC. Which etching for improvement of the retention of the Maryland bridge. Chemically is better [in Italian]. Attual Dent 1986;2:8–9, 11.
227. Caltabiano M, Cicciu D, Verzi P. The importance of the Maryland bridge in orthognathodontics [in Italian]. Stomatol Mediterr 1987;7:352–364.
228. Carrese JA, Mullaney JL, Faden RR, Finucane TE. Planning for death but not serious future illness: Qualitative study of housebound elderly patients. BMJ 2002;325:125.
229. Chadwick B, Treasure E, Dummer P, et al. Challenges with studies investigating longevity of dental restorations—A critique of a systematic review. J Dent 2001;29:155–161.
230. Chafaie A, Portier R. Anterior fiber-reinforced composite resin bridge: A case report. Pediatr Dent 2004;26:530–534.
231. Cheung GS, Dimmer A, Mellor R, Gale M. A clinical evaluation of conventional bridgework. J Oral Rehabil 1990;17:131–136.
232. Clyde JS, Boyd T. The etched cast metal resin-bonded (Maryland) bridge: A clinical review. J Dent 1988;16:22–26.
233. Collesanto V, Pessina E, Piacentini C, Menghini P. The Maryland bridge: Scanning electron microscopy evaluation of an etching technic for the metal [in Italian]. G Stomatol Ortognatodonzia 1985;4:17–26.
234. Cordeiro PG, Santamaria E. A classification system and algorithm for reconstruction of maxillectomy and midfacial defects. Plast Reconstr Surg 2000;105:2331–2346.
235. Corrente G, Vergnano L, Re S, Cardaropoli D, Abundo R. Resin-bonded fixed partial dentures and splints in periodontally compromised patients: A 10-year follow-up. Int J Periodontics Restorative Dent 2000;20:628–636.
236. Creugers NH, de Kanter RJ, Verzijden CW, van 't Hof MA. Five year survival of posterior adhesive bridges. Influence of bonding systems and tooth preparation [in Dutch]. Ned Tijdschr Tandheelkd 1999;106:250–253.
237. Creugers NH, Snoek PA, van 't Hof MA, Kayser AF. Clinical performance of resin-bonded bridges: A 5-year prospective study. Part III: Failure characteristics and survival after rebonding. J Oral Rehabil 1990;17:179–186.

238. De Kanter RJ, Creugers NH, Verzijden CW, van 't Hof MA. A five-year multi-practice clinical study on posterior resin-bonded bridges. J Dent Res 1998;77:609–614.
239. De Wijs FL, Cune MS, De Putter C. Delayed implants in the anterior maxilla with the IMZ-implant system. J Oral Rehabil 1995;22:319–326.
240. Decock V, De Nayer K, De Boever JA, Dent M. 18-year longitudinal study of cantilevered fixed restorations. Int J Prosthodont 1996;9:331–340.
241. Dietz ER. The Maryland bridge as restoration alternative. Dent Assist (Waco TX) 1983;2:30–31, 38.
242. Dimashkieh MR, al-Shammery AR. Long-term survival of sleeve-designed fixed partial dentures: A clinical report. J Prosthet Dent 2000;84:591–593.
243. Drummond JL, Khalaf MA. Shear strength and filler particle characterization of Maryland (acid etch) bridge resin cements. Dent Mater 1989;5:209–212.
244. Dummer PM, Gidden J. The Maryland bridge: A useful modification. J Dent 1986;14:42–43.
245. Ellakwa AE, Shortall AC, Marquis PM. Influence of different techniques of laboratory construction on the fracture resistance of fiber-reinforced composite (FRC) bridges. J Contemp Dent Pract 2004;5:1–13.
246. el-Mowafy O, Rubo MH. Resin-bonded fixed partial dentures—A literature review with presentation of a novel approach. Int J Prosthodont 2000;13:460–467.
247. Ericson G, Nilson H, Bergman B. Cross-sectional study of patients fitted with fixed partial dentures with special reference to the caries situation. Scand J Dent Res 1990;98:8–16.
248. Favero GA, Carnesecchi L. The Maryland bridge: A conservative denture with a "low biological price" [in Italian]. G Stomatol Ortognatodonzia 1985;4:88–90.
249. Fayyad MA, al-Rafee MA. Failure of dental bridges: III—Effect of some technical factors. J Oral Rehabil 1996;23:675–678.
250. Fayyad MA, al-Rafee MA. Failure of dental bridges. II. Prevalence of failure and its relation to place of construction. J Oral Rehabil 1996;23:438–440.
251. Fayyad MA, al-Rafee MA. Failure of dental bridges. IV. Effect of supporting periodontal ligament. J Oral Rehabil 1997;24:401–403.
252. Febbo A, Cozza P. Use of a Maryland bridge in a case of tooth agenesis. A bridge across the void [in Italian]. Attual Dent 1985;1:28–30.
253. Ferrari M, Cagidiaco MC. The Maryland bridge [in Italian]. Dent Cadmos 1984;52:39, 42–43, 46–47.
254. Flood AM. Resin bonded prostheses: Clinical guidelines. Aust Dent J 1989;34:209–218.
255. Freilich MA, Meiers JC, Duncan JP, Eckrote KA, Goldberg AJ. Clinical evaluation of fiber-reinforced fixed bridges. J Am Dent Assoc 2002;133:1524–1534.
256. Freilich MA, Niekrash CE, Katz RV, Simonsen RJ. The effects of resin-bonded and conventional fixed partial dentures on the periodontium: Restoration type evaluated. J Am Dent Assoc 1990;121:265–269.
257. Fuller CM, Vlahov D, Latkin CA, Ompad DC, Celentano DD, Strathdee SA. Social circumstances of initiation of injection drug use and early shooting gallery attendance: Implications for HIV intervention among adolescent and young adult injection drug users. J Acquir Immune Defic Syndr 2003;32:86–93.
258. Glantz PO, Nilner K. Patient age and long term survival of fixed prosthodontics. Gerodontology 1993;10:33–39.
259. Glantz PO, Nilner K, Jendresen MD, Sundberg H. Quality of fixed prosthodontics after 15 years. Acta Odontol Scand 1993;51:247–252.
260. Glantz PO, Nilner K, Jendresen MD, Sundberg H. Quality of fixed prosthodontics after twenty-two years. Acta Odontol Scand 2002;60:213–218.
261. Gohring TN, Roos M. Inlay-fixed partial dentures adhesively retained and reinforced by glass fibers: Clinical and scanning electron microscopy analysis after five years. Eur J Oral Sci 2005;113:60–69.
262. Gorlick R, Anderson P, Andrulis I, et al. Biology of childhood osteogenic sarcoma and potential targets for therapeutic development: Meeting summary. Clin Cancer Res 2003;9:5442–5453.
263. Gotfredsen K, Karlsson U. A prospective 5-year study of fixed partial prostheses supported by implants with machined and TiO2-blasted surface. J Prosthodont 2001;10:2–7.
264. Gragg KL, Shugars DA, Bader JD, Elter JR, White BA. Movement of teeth adjacent to posterior bounded edentulous spaces. J Dent Res 2001;80:2021–2024.
265. Greco S, Cicciu D. Use of the Maryland bridge in periodontology [in Italian]. Stomatol Mediterr 1989;9:43–48.
266. Guida L, Pensa G, Minervini G, Belardo S. "Maryland Bridge" technique and its possible use in periodontology [in Italian]. Arch Stomatol (Napoli) 1989;30:1267–1277.
267. Hall RM. Recruitment and retention: Getting back on track after above average minority students dropout. ABNF J 1997;8:11–13.
268. Hammerle CH. Success and failure of fixed bridgework. Periodontol 2000 1994;4:41–51.
269. Heged PC, Kalas A, Tar I. Application and survival rate of partial fixed dentures with combined retainers (adhesion wing, inlay, onlay, overlay, crown) [in Hungarian]. Fogorv Sz 1998;91:99–105.
270. Heinenberg BJ. If not, why not! Considerations on the Maryland bridge [in German]. Quintessenz 1984;35:2289–2290.
271. Heinenberg BJ, Maus H. Clinical preparation of the Maryland bridge [in German]. Quintessenz 1983;34:1157–1163.
272. Hickel R. Care of anterior diastemata in patients with lip-jaw-palate clefts [in German]. Fortschr Kieferorthop 1989;50:75–80.
273. Himmel R, Pilo R, Assif D, Aviv I. The cantilever fixed partial denture—A literature review. J Prosthet Dent 1992;67:484–487.
274. Hochman N, Mitelman L, Hadani PE, Zalkind M. A clinical and radiographic evaluation of fixed partial dentures (FPDs) prepared by dental school students: A retrospective study. J Oral Rehabil 2003;30:165–170.
275. Hochman N, Yaffe A, Ehrlich J. Splinting: A retrospective 17-year follow-up study. J Prosthet Dent 1992;67:600–602.
276. Holley R. The Arizona bridge: An alternate arrangement to the Maryland-style bridge. Dent Today 1999;18:86–87.
277. Holm B. The Maryland Bridge—An alternative to conventional bridges [in Danish]. Tandlaegebladet 1986;90:669–676.
278. Holm C, Tidehag P, Tillberg A, Molin M. Longevity and quality of FPDs: A retrospective study of restorations 30, 20, and 10 years after insertion. Int J Prosthodont 2003;16:283–289.
279. Holste T. Actual facial points as indication for bonded bridges [in German]. ZWR 1991;100:320, 323–324, 326–328.
280. Hornbrook DS. Placement protocol for an anterior fiber-reinforced composite restoration. Pract Periodontics Aesthet Dent 1997;9(5 suppl):1–5.
281. Ibaseta-Diaz G, Alvarez-Arenal A, Ellacuria-Echevarria J, Espinosa-Marino J, Maza Cano JL. Orthodontic and prosthodontic treatment in dental avulsion cases. Am J Dent 2002;15:346–348.
282. Jacobi R, Shillingburg HT Jr, Duncanson MG Jr. Effect of abutment mobility, site, and angle of impact on retention of fixed partial dentures. J Prosthet Dent 1985;54:178–183.

283. Jain P, Cobb D. Evaluation of a glass-fiber-reinforced, bonded, inlay-supported fixed partial denture—4-year results. Compend Contin Educ Dent 2002;23:779–783, 786.
284. Jemt T, Henry P, Linden B, Naert I, Weber H, Wendelhag I. Implant-supported laser-welded titanium and conventional cast frameworks in the partially edentulous jaw: A 5-year prospective multicenter study. Int J Prosthodont 2003;16:415–421.
285. Jepson N, Allen F, Moynihan P, Kelly P, Thomason M. Patient satisfaction following restoration of shortened mandibular dental arches in a randomized controlled trial. Int J Prosthodont 2003;16:409–414.
286. Johansson LA, Ekfeldt A. Implant-supported fixed partial prostheses: A retrospective study. Int J Prosthodont 2003;16:172–176.
287. Johnston C, Hussey DL. The immediate replacement of incisor teeth by cantilevered adhesive bridgework. Dent Update 1993;20:333–334.
288. Karlsson S. A clinical evaluation of fixed bridges, 10 years following insertion. J Oral Rehabil 1986;13:423–432.
289. Karlsson S. Failures and length of service in fixed prosthodontics after long-term function. A longitudinal clinical study. Swed Dent J 1989;13:185–192.
290. Karlsson S, Hedegard B. Follow-up studies of patients with extensive bridge constructions. I: A study performed in 1982–83 to evaluate patients treated in 1974–75 in private dental practice [in Swedish]. Tandlakartidningen 1984;76:935–936, 941–946.
291. Karlsson U, Gotfredsen K, Olsson C. A 2-year report on maxillary and mandibular fixed partial dentures supported by Astra Tech dental implants. A comparison of 2 implants with different surface textures. Clin Oral Implants Res 1998;9:235–242.
292. Kaus T, Probster L, Weber H. Clinical follow-up study of ceramic veneered titanium restorations—Three-year results. Int J Prosthodont 1996;9:9–15.
293. Kellett M, Verzijden CW, Smith GA, Creugers NH. A multicentered clinical study on posterior resin-bonded bridges: The 'Manchester trial'. J Dent 1994;22:208–212.
294. Kern M, Glaser R. Cantilevered all-ceramic, resin-bonded fixed partial dentures: A new treatment modality. J Esthet Dent 1997;9:255–264.
295. Kern M, Strub JR. Resin bonding bridges—State of the art [in German]. Parodontol 1990;1:55–68.
296. Kerschbaum T, Haastert B, Marinello CP. Risk of debonding in three-unit resin-bonded fixed partial dentures. J Prosthet Dent 1996;75:248–253.
297. Kerschbaum T, Paszyna C, Klapp S, Meyer G. Failure-time and risk analysis of fixed partial dentures [in German]. Dtsch Zahnarztl Z 1991;46:20–24.
298. Kerstein RB. Computerized occlusal management of a fixed/detachable implant prosthesis. Pract Periodontics Aesthet Dent 1999;11:1093–1102.
299. Ketabi AR, Kaus T, Herdach F, et al. Thirteen-year follow-up study of resin-bonded fixed partial dentures. Quintessence Int 2004;35:407–410.
300. Kimmel K. The Maryland bridge [in German]. ZWR 1983;92:10–16.
301. Kindberg H, Gunne J, Kronstrom M. Tooth- and implant-supported prostheses: A retrospective clinical follow-up up to 8 years. Int J Prosthodont 2001;14:575–581.
302. Kirzioglu Z, Erturk MS. Success of reinforced fiber material space maintainers. J Dent Child (Chic) 2004;71:158–162.
303. Kline R, Hoar JE, Beck GH, Hazen R, Resnik RR, Crawford EA. A prospective multicenter clinical investigation of a bone quality-based dental implant system. Implant Dent 2002;11:224–234.
304. Knobloch L, Larsen PA, Rashid B, Carr AB. Six-month performance of implants with oxidized and machined surfaces restored at 2, 4, and 6 weeks postimplantation in adult beagle dogs. Int J Oral Maxillofac Implants 2004;19:350–356.
305. Kohen SG. Maryland bridge: Evaluation of the metal etching technic [in Spanish]. Rev Asoc Odontol Argent 1986;74:40, 44–45.
306. Koutayas SO, Kern M, Ferraresso F, Strub JR. Influence of design and mode of loading on the fracture strength of all-ceramic resin-bonded fixed partial dentures: An in vitro study in a dual-axis chewing simulator. J Prosthet Dent 2000;83:540–547.
307. Koutayas SO, Kern M, Ferraresso F, Strub JR. Influence of framework design on fracture strength of mandibular anterior all-ceramic resin-bonded fixed partial dentures. Int J Prosthodont 2002;15:223–229.
308. Krennmair G, Waldenberger O. Clinical analysis of wide-diameter Frialit-2 implants. Int J Oral Maxillofac Implants 2004;19:710–715.
309. Kutz FW, Wade TG, Pagac BB. A geospatial study of the potential of two exotic species of mosquitoes to impact the epidemiology of West Nile virus in Maryland. J Am Mosq Control Assoc 2003;19:190–198.
310. Lang NP, Pjetursson BE, Tan K, Bragger U, Egger M, Zwahlen M. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. II. Combined tooth–implant-supported FPDs. Clin Oral Implants Res 2004;15:643–653.
311. Laurell L, Lundgren D, Falk H, Hugoson A. Long-term prognosis of extensive polyunit cantilevered fixed partial dentures. J Prosthet Dent 1991;66:545–552.
312. Leempoel PJ, Kayser AF, Van Rossum GM, de Haan AF. The survival rate of bridges. A study of 1674 bridges in 40 Dutch general practices. J Oral Rehabil 1995;22:327–330.
313. Leempoel PJ, van 't Hof MA, de Haan AF. Survival studies of dental restorations: Criteria, methods and analyses. J Oral Rehabil 1989;16:387–394.
314. Lekholm U, Gunne J, Henry P, et al. Survival of the Brånemark implant in partially edentulous jaws: A 10-year prospective multicenter study. Int J Oral Maxillofac Implants 1999;14:639–645.
315. Lewinstein I, Ganor Y, Pilo R. Abutment positioning in a cantilevered shortened dental arch: A clinical report and static analysis. J Prosthet Dent 2003;89:227–231.
316. Li DW, Fradkin JF, Luks S, Tuchman B. Application of the Maryland bridge to a difficult case: A clinical report. N Y State Dent J 1988;54:23–24.
317. Li W, Swain MV, Li Q, Ironside J, Steven GP. Fibre reinforced composite dental bridge. Part I: Experimental investigation. Biomaterials 2004;25:4987–4993.
318. Libby G, Arcuri MR, LaVelle WE, Hebl L. Longevity of fixed partial dentures. J Prosthet Dent 1997;78:127–131.
319. Lill W, Forster H, Eckhardt C, Matejka M, Watzek G. Conditions of the gingiva around endosteal implants with attached and unattached mucosa [in German]. Z Stomatol 1989;86:153–162.
320. Lindh T, Back T, Nystrom E, Gunne J. Implant versus tooth-implant supported prostheses in the posterior maxilla: A 2-year report. Clin Oral Implants Res 2001;12:441–449.
321. Lindquist E, Karlsson S. Success rate and failures for fixed partial dentures after 20 years of service: Part I. Int J Prosthodont 1998;11:133–138.
322. Livaditis GJ, Thompson VP. The Maryland bridge technique. TIC 1982;41:7–10.

323. Lum LB, Beirne OR, Curtis DA. Histologic evaluation of hydroxylapatite-coated versus uncoated titanium blade implants in delayed and immediately loaded applications. Int J Oral Maxillofac Implants 1991;6:456–462.
324. Lundershausen K. Retention-adhesion bridge (modified Maryland bridge) [in German]. Dtsch Zahnarztl Z 1984;39:408–412.
325. Lutzmann M. Maryland bridge, a valuable partial denture [in German]. Dent Labor (Munch) 1983;31:591–592.
326. Manhart J, Chen H, Hamm G, Hickel R. Buonocore Memorial Lecture. Review of the clinical survival of direct and indirect restorations in posterior teeth of the permanent dentition. Oper Dent 2004;29:481–508.
327. Marcucci M, Bandettini MV, Valenti G. Anchorage of the "Maryland bridge" to front teeth [in Italian]. Attual Dent 1988;4:34–40.
328. Marcus M, Reifel NM, Nakazono TT. Clinical measures and treatment needs. Adv Dent Res 1997;11:263–271.
329. Marotta JD. The half-fixed and half Maryland bridge. A solution to a difficult situation. Oral Health 1986;76:31–32.
330. Mazurat RD. Longevity of partial, complete and fixed prostheses: A literature review. J Can Dent Assoc 1992;58:500–504.
331. Meyer G, Blandow HP. Maryland bridge as a practical alternative [in German]. Dent Labor (Munch) 1985;33:987–988.
332. Meyer G, Blandow HP. Maryland bridge in correct use [in German]. Zahntechnik (Zur) 1985;43:302–306.
333. Miller SM, Bowen DJ, Campbell MK, et al. Current research promises and challenges in behavioral oncology: Report from the American Society of Preventive Oncology annual meeting, 2002. Cancer Epidemiol Biomarkers Prev 2004;13:171–180.
334. Miller TE. Reverse Maryland bridges: Clinical applications. J Esthet Dent 1989;1:155–163.
335. Miranda ME. Fixed dentures with composite resin and electrolytic acid etching. The Maryland Bridge [in Portuguese]. RGO 1983;31:356–360.
336. Mito RS, Caputo AA, James DF. Load transfer to abutment teeth by two non-metal adhesive bridges. Pract Periodontics Aesthet Dent 1991;3:31–37.
337. Monya Y, Matsumura H, Atsuta M. A two-stage resin-bonded fixed partial denture seated in conjunction with postextraction healing of the alveolar socket: A clinical report. J Prosthet Dent 1998;80:4–8.
338. Moschen I, Kulmer S, Schaffer H. The Pontic. Preventive consideration of pontic design [in German]. Parodontol 1991;2:7–23.
339. Muche R, Krausse A, Strub JR. Success rates of implant supported prostheses in partially edentulous patients—Part II [in German]. Schweiz Monatsschr Zahnmed 2003;113:404–410.
340. Mudassir A, Aboush YE, Hosein M, Hosein T, Padihar I. Long-term clinical performance of resin-bonded fixed partial dentures placed in a developing country. J Prosthodont 1995;4:233–236.
341. Naert IE, Duyck JA, Hosny MM, van Steenberghe D. Freestanding and tooth-implant connected prostheses in the treatment of partially edentulous patients. Part I: An up to 15-years clinical evaluation. Clin Oral Implants Res 2001;12:237–244.
342. Nagasiri R, Chitmongkolsuk S. Long-term survival of endodontically treated molars without crown coverage: A retrospective cohort study. J Prosthet Dent 2005;93:164–170.
343. Napankangas R, Salonen-Kemppi MA, Raustia AM. Longevity of fixed metal ceramic bridge prostheses: A clinical follow-up study. J Oral Rehabil 2002;29:140–145.
344. Novak A, Sedej R. The Maryland bridge and its strength [in Croatian]. Zobozdrav Vestn 1984;39:87–97.
345. O'Campo P, Gielen AC, Faden RR, Xue X, Kass N, Wang MC. Violence by male partners against women during the childbearing year: A contextual analysis. Am J Public Health 1995;85:1092–1097.
346. Ohlendorf KD. Modification of a Maryland bridge [in German]. Quintessenz Zahntech 1991;17:173–176.
347. Olson JW, Dent CD, Morris HF, Ochi S. Long-term assessment (5 to 71 months) of endosseous dental implants placed in the augmented maxillary sinus. Ann Periodontol 2000;5:152–156.
348. Olsson KG, Furst B, Andersson B, Carlsson GE. A long-term retrospective and clinical follow-up study of In-Ceram Alumina FPDs. Int J Prosthodont 2003;16:150–156.
349. Owall B. Precision attachment retained removable partial dentures: 1. Technical long-term study. Int J Prosthodont 1991;4:249–257.
350. Ozcan M, Niedermeier W. Clinical study on the reasons for and location of failures of metal-ceramic restorations and survival of repairs. Int J Prosthodont 2002;15:299–302.
351. Paduano S, Laino A, Michelotti A, Viglione G. Use of the Maryland bridge for space maintenance: Discussion of a clinical case [in Italian]. Arch Stomatol (Napoli) 1988;29:1317–1326.
352. Palazzoli G. Economical and practical aspects of the Maryland bridge [in Italian]. Riv Ital Odontotec 1984;20:28–31.
353. Palazzoli G. A clinical case resolved by the use of a variation of the Maryland bridge technic [in Italian]. Dent Cadmos 1985;53:79–80.
354. Palmqvist S, Soderfeldt B. Multivariate analyses of factors influencing the longevity of fixed partial dentures, retainers, and abutments. J Prosthet Dent 1994;71:245–250.
355. Palmqvist S, Swartz B. Artificial crowns and fixed partial dentures 18 to 23 years after placement. Int J Prosthodont 1993;6:279–285.
356. Pang SE. A report of anterior In-Ceram restorations. Ann Acad Med Singapore 1995;24:33–37.
357. Paterson N. The longevity of restorations. A study of 200 regular attenders in a general dental practice. Br Dent J 1984;157:23–25.
358. Pellecchia M, Pellecchia R, Emtiaz S. Distal extension mandibular removable partial denture connected to an anterior fixed implant-supported prosthesis: A clinical report. J Prosthet Dent 2000;83:607–612.
359. Petrikas AO, Kliuev BS. A method for preparing the abutment teeth for resin-bonded bridge dentures and resin-bonded facings (veneers) and its anatomical validation [in Russian]. Stomatologiia (Mosk) 1997;76:46–50.
360. Petrovsky ME. A technique for the replacement of multiple missing anterior teeth in the presence of a mutilated alveolar ridge. J Tenn Dent Assoc 1991;71:33–35.
361. Pjetursson BE, Tan K, Lang NP, Bragger U, Egger M, Zwahlen M. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. Clin Oral Implants Res 2004;15:667–676.
362. Plainfield S, Wood V, Podesta R. A stress-relieved resin-bonded fixed partial denture. J Prosthet Dent 1989;61:291–293.
363. Pospiech P, Rammelsberg P, Goldhofer G, Gernet W. All-ceramic resin-bonded bridges. A 3-dimensional finite-element analysis study. Eur J Oral Sci 1996;104(4(Pt 1)):390–395.
364. Poyser NJ, Briggs PF, Chana HS. A modern day application of the Rochette bridge. Eur J Prosthodont Restor Dent 2004;12:57–62.
365. Preston JD. Preventing ceramic failures when integrating fixed and removable prostheses. Dent Clin North Am 1979;23:37–52.
366. Priest G. An 11-year reevaluation of resin-bonded fixed partial dentures. Int J Periodontics Restorative Dent 1995;15:238–247.

367. Priest GF. Failure rates of restorations for single-tooth replacement. Int J Prosthodont 1996;9:38–45.
368. Probster B, Henrich GM. 11-year follow-up study of resin-bonded fixed partial dentures. Int J Prosthodont 1997;10:259–268.
369. Probster L. Survival rate of In-Ceram restorations. Int J Prosthodont 1993;6:259–263.
370. Prosper L, Gherlone EF, Redaelli S, Quaranta M. Four-year follow-up of larger-diameter implants placed in fresh extraction sockets using a resorbable membrane or a resorbable alloplastic material. Int J Oral Maxillofac Implants 2003;18:856–864.
371. Quinn F, Gratton DR, McConnell RJ. The performance of conventional, fixed bridgework, retained by partial coverage crowns. J Ir Dent Assoc 1995;41:6–9.
372. Raghoebar GM, Friberg B, Grunert I, Hobkirk JA, Tepper G, Wendelhag I. 3-year prospective multicenter study on one-stage implant surgery and early loading in the edentulous mandible. Clin Implant Dent Relat Res 2003;5:39–46.
373. Raigrodski AJ. Clinical and laboratory considerations for the use of CAD/CAM Y-TZP-based restorations. Pract Proced Aesthet Dent 2003;15:469–476.
374. Raigrodski AJ. Contemporary all-ceramic fixed partial dentures: A review. Dent Clin North Am 2004;48:viii, 531–544.
375. Rammelsberg P, Pospiech P, Gernet W. Clinical factors affecting adhesive fixed partial dentures: A 6-year study. J Prosthet Dent 1993;70:300–307.
376. Randow K, Derand T. On functional strain in fixed and removable partial dentures. An experimental in vivo study. Acta Odontol Scand 1993;51:333–338.
377. Randow K, Glantz PO, Zoger B. Technical failures and some related clinical complications in extensive fixed prosthodontics. An epidemiological study of long-term clinical quality. Acta Odontol Scand 1986;44:241–255.
378. Raustia AM, Napankangas R, Salonen AM. Complications and primary failures related to fixed metal ceramic bridge prostheses made by dental students. J Oral Rehabil 1998;25:677–680.
379. Reinlib L, Abraham W. Recovery from heart failure with circulatory assist: A working group of the National, Heart, Lung, and Blood Institute. J Card Fail 2003;9:459–463.
380. Reuter JE, Brose MO. Failures in full crown retained dental bridges. Br Dent J 1984;157:61–63.
381. Riley ED, Safaeian M, Strathdee SA, Brooner RK, Beilenson P, Vlahov D. Drug user treatment referrals and entry among participants of a needle exchange program. Subst Use Misuse 2002;37:1869–1886.
382. Roberts DH. The failure of retainers in bridge prostheses. An analysis of 2,000 retainers. Br Dent J 1970;128:117–124.
383. Rokni SR. Combination acid-etched and coping-superstructure fixed partial prosthesis. Quintessence Int 1996;27:189–192.
384. Romagnoli M. Microcrystals for the Maryland bridge [in Italian]. Attual Dent 1986;2:35–37, 39, 41.
385. Samama Y. Fixed bonded prosthodontics: A 10-year follow-up report. Part I: Analytical overview. Int J Periodontics Restorative Dent 1995;15:424–435.
386. Samama Y. Fixed bonded prosthodontics: A 10-year follow-up report. Part II. Clinical assessment. Int J Periodontics Restorative Dent 1996;16:52–59.
387. Sardelis MR, Turell MJ, O'Guinn ML, Andre RG, Roberts DR. Vector competence of three North American strains of Aedes albopictus for West Nile virus. J Am Mosq Control Assoc 2002;18:284–289.
388. Schmitt SM, Brown FH. Management of root-amputated maxillary molar teeth: Periodontal and prosthetic considerations. J Prosthet Dent 1989;61:648–652.
389. Selby A. Fixed prosthodontic failure. A review and discussion of important aspects. Aust Dent J 1994;39:150–156.
390. Serdar-Cotert H, Ozturk B. Posterior bridges retained by resin-bonded cast metal inlay retainers: A report of 60 cases followed for 6 years. J Oral Rehabil 1997;24:697–704.
391. Sewon LA, Ampula L, Vallittu PK. Rehabilitation of a periodontal patient with rapidly progressing marginal alveolar bone loss: 1-year follow-up. J Clin Periodontol 2000;27:615–619.
392. Sharma P. 90% of fixed partial dentures survive 5 years. How long do conventional fixed partial dentures (FPDs) survive and how frequently do complications occur? Evid Based Dent 2005;6:74–75.
393. Shugars DA, Bader JD, Phillips SW Jr, White BA, Brantley CF. The consequences of not replacing a missing posterior tooth. J Am Dent Assoc 2000;131:1317–1323.
394. Shugars DA, Bader JD, White BA, Scurria MS, Hayden WJ Jr, Garcia RI. Survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. J Am Dent Assoc 1998;129:1089–1095.
395. Siervo S, Pampalone A, Siervo P, Cerri E, Bandettini B, Siervo R. Rescue of a "hopeless" second premolar. Oral Surg Oral Med Oral Pathol 1993;76:276–278.
396. Snyder EP, Subtelny JD. An American Board of Orthodontics case report. Orthodontic treatment of a patient born with a severe right unilateral cleft lip and palate. Am J Orthod Dentofacial Orthop 1989;95:273–281.
397. Soderfeldt B, Palmqvist S. A multilevel analysis of factors affecting the longevity of fixed partial dentures, retainers and abutments. J Oral Rehabil 1998;25:245–252.
398. Sognnaes RF. Preface to professional progress from Washington's old ivory relics to the modern Maryland bridge. J Md State Dent Assoc 1983;26:79–86.
399. Solimei GE, Barucchi AM, Gaviano E, Montagna E. The Maryland bridge: Acid etched bonded dentures. Cementation [in Italian]. Parodontol Stomatol (Nuova) 1985;24:109–114.
400. Sorensen JA, Kang SK, Torres TJ, Knode H. In-Ceram fixed partial dentures: Three-year clinical trial results. J Calif Dent Assoc 1998;26:207–214.
401. Sorley DL, Levin ML, Warren JW, Flynn JP, Gersenblith. Bat-associated histoplasmosis in Maryland bridge workers. Am J Med 1979;67:623–626.
402. Stein JM. Functional prosthetic treatment for the partially edentulous with osseointegrated implants [in French]. Cah Prothese 1990;(72):102–110.
403. Stockton LW. Cantilever fixed partial denture—A literature review. J Can Dent Assoc 1997;63:118–121.
404. Strathdee SA, Celentano DD, Shah N, et al. Needle-exchange attendance and health care utilization promote entry into detoxification. J Urban Health 1999;76:448–460.
405. Studer SP, Mader C, Stahel W, Scharer P. A retrospective study of combined fixed-removable reconstructions with their analysis of failures. J Oral Rehabil 1998;25:513–526.
406. Styner D, Poulos J, Chimerine R, Luster JE, Ferrara M. Immediate provisional and long-term anterior prosthodontics: A comprehensive approach. Compend Contin Educ Dent 1996;17:560–562.
407. Sundh B, Odman P. A study of fixed prosthodontics performed at a university clinic 18 years after insertion. Int J Prosthodont 1997;10:513–519.
408. Suttor D. Lava zirconia crowns and bridges. Int J Comput Dent 2004;7:67–76.

409. Tangerud T, Gronningsaeter AG, Taylor A. Fixed partial dentures supported by natural teeth and Brånemark system implants: A 3-year report. Int J Oral Maxillofac Implants 2002;17:212–219.
410. Thompson VP. The Maryland bridge [in German]. Phillip J Restaur Zahnmed 1985;2:23–26.
411. Tinschert J, Natt G, Mautsch W, Spiekermann H, Anusavice KJ. Marginal fit of alumina- and zirconia-based fixed partial dentures produced by a CAD/CAM system. Oper Dent 2001;26:367–374.
412. Tinsley D, Watson CJ, Russell JL. A comparison of hydroxylapatite coated implant retained fixed and removable mandibular prostheses over 4 to 6 years. Clin Oral Implants Res 2001;12:159–166.
413. Trentalancia M, Gallini G, Pasqualini M. Maryland bridge: Presentation of 2 bonded complete upper fixed dentures [in Italian]. Dent Cadmos 1986;54:47–48, 51–56.
414. Trushkowsky R. Fiber-reinforced composite bridge and splint. Replacing congenitally missing teeth. N Y State Dent J 2004;70:34–38.
415. Trushkowsky RD. Replacement of congenitally missing lateral incisors with ceramic resin-bonded fixed partial dentures. J Prosthet Dent 1995;73:12–16.
416. Valderhaug J. A 15-year clinical evaluation of fixed prosthodontics. Acta Odontol Scand 1991;49:35–40.
417. Valderhaug J, Jokstad A, Ambjornsen E, Norheim PW. Assessment of the periapical and clinical status of crowned teeth over 25 years. J Dent 1997;25:97–105.
418. Vallittu PK. Survival rates of resin-bonded, glass fiber-reinforced composite fixed partial dentures with a mean follow-up of 42 months: A pilot study. J Prosthet Dent 2004;91:241–246.
419. Vallittu PK, Sevelius C. Resin-bonded, glass fiber-reinforced composite fixed partial dentures: A clinical study. J Prosthet Dent 2000;84:413–418.
420. van Dalen A, Feilzer AJ. Cantilever resin-bonded bridges with one adhesive surface. A review of the literature [in Dutch]. Ned Tijdschr Tandheelkd 2003;110:143–148.
421. van Dalen A, Feilzer AJ, Kleverlaan CJ. A literature review of two-unit cantilevered FPDs. Int J Prosthodont 2004;17:281–284.
422. Van Nieuwenhuysen JP, D'Hoore W, Carvalho J, Qvist V. Long-term evaluation of extensive restorations in permanent teeth. J Dent 2003;31:395–405.
423. Verzijden CW, Creugers NH, Mulder J. A multi-practice clinical study on posterior resin-bonded bridges: A 2.5-year interim report. J Dent Res 1994;73:529–535.
424. Verzijden CW, Creugers NH, van 't Hof MA. Treatment times for posterior resin-bonded bridges. Community Dent Oral Epidemiol 1990;18:304–308.
425. Verzijden CW, Creugers NH, van 't Hof MA. A meta-analysis of two different trials on posterior resin-bonded bridges. J Dent 1994;22:29–32.
426. Vitsentzos SI. A new device to directly examine parallelism of abutment teeth. J Prosthet Dent 1989;61:531–534.
427. Walker RS. Pin stabilization of a partially uncemented Maryland bridge. Gen Dent 1988;36:139–140.
428. Walter M, Boning K, Reppel PD. Clinical performance of machined titanium restorations. J Dent 1994;22:346–348.
429. Walter M, Reppel PD, Boning K, Freesmeyer WB. Six-year follow-up of titanium and high-gold porcelain-fused-to-metal fixed partial dentures. J Oral Rehabil 1999;26:91–96.
430. Walton JN, Gardner FM, Agar JR. A survey of crown and fixed partial denture failures: Length of service and reasons for replacement. J Prosthet Dent 1986;56:416–421.
431. Walton TR. A ten-year longitudinal study of fixed prosthodontics: 1. Protocol and patient profile. Int J Prosthodont 1997;10:325–331.
432. Walton TR. A 10-year longitudinal study of fixed prosthodontics: Clinical characteristics and outcome of single-unit metal-ceramic crowns. Int J Prosthodont 1999;12:519–526.
433. Walton TR. An up to 15-year longitudinal study of 515 metal-ceramic FPDs: Part 1. Outcome. Int J Prosthodont 2002;15:439–445.
434. Walton TR. An up to 15-year longitudinal study of 515 metal-ceramic FPDs: Part 2. Modes of failure and influence of various clinical characteristics. Int J Prosthodont 2003;16:177–182.
435. Wang CH, Tsai CC, Chen TY, Chang GL. Photoelastic stress analysis of mandibular posterior cantilevered pontic. J Oral Rehabil 1996;23:662–666.
436. Watanabe F, Powers JM, Lorey RE. In vitro bonding of prosthodontic adhesives to dental alloys. J Dent Res 1988;67:479–483.
437. Wenz HJ, Lehmann KM. A telescopic crown concept for the restoration of the partially edentulous arch: The Marburg double crown system. Int J Prosthodont 1998;11:541–550.
438. Wilkes PW, Shillingburg HT Jr, Johnson DL. Effects of resistance form on attachment strength of resin-retained castings. J Okla Dent Assoc 2000;90:16–20, 22, 24–25.
439. Williams VD, Drennon DG, Silverstone LM. The effect of retainer design on the retention of filled resin in acid-etched fixed partial dentures. J Prosthet Dent 1982;48:417–423.
440. Wood M, Thompson VP. Resin-bonded prosthodontics. An update. Dent Clin North Am 1993;37:445–455.
441. Wood M, Thompson VP, Romberg E, Morrison GV. Resin-bonded fixed partial dentures. I. Proposed standardized criteria for evaluation. J Prosthet Dent 1996;76:363–367.
442. Wright WE. Success with the cantilever fixed partial denture. J Prosthet Dent 1986;55:537–539.
443. Yang HS, Chung HJ, Park YJ. Stress analysis of a cantilevered fixed partial denture with normal and reduced bone support. J Prosthet Dent 1996;76:424–430.
444. Yang JH. A clinical study on the distribution and the bond failure of etched Maryland bridge (I). A preliminary report of 135 cases [in Korean]. Taehan Chikkwa Uisa Hyophoe Chi 1987;25:578–587.
445. Yap AU, Stokes AN. Resin-bonded prostheses. Quintessence Int 1995;26:521–530.
446. Zalkind M, Ever-Hadani P, Hochman N. Resin-bonded fixed partial denture retention: A retrospective 13-year follow-up. J Oral Rehabil 2003;30:971–977.
447. Zimmer D, Gerds T, Strub JR. Survival rate of IPS-Empress 2 all-ceramic crowns and bridges: Three year's results [in German]. Schweiz Monatsschr Zahnmed 2004;114:115–119.

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SECTION 3
CONSENSUS REPORT

In patients requiring single-tooth replacement, what are the outcomes of implants as compared to tooth-supported restorations?

Members of Section 3 evaluated the systematic review on the outcomes of replacing single teeth with implants as compared with conventional segmental prostheses. The focused PICO question addressed by the authors, Thomas J. Salinas and Steven E. Eckert, of the evidence-based systematic review is: In patients requiring single-tooth replacement, what are the outcomes of implant- as compared to tooth-supported restorations?

An overriding issue that arose in the formation of this systematic review was that there are no comparative studies of fixed partial dentures (FPDs) and implant-supported crowns (ISCs). Thus, criteria were selected to allow enough time following prosthetic loading (>2 years post-implant placement) with a sufficient number of samples being followed (>12) that would allow for attrition. The consensus of the section was that the inclusion/exclusion criteria were appropriate. These were: *(1)* >2-year follow-up; *(2)* >12 restorations; *(3)* English language; *(4)* a "pure" single-tooth replacement study in humans (ie, a study that clearly identified single-tooth restorations relative to other restorations and involved a bounded edentulous space; and *(5)* data presented with success or survival.

1. Does the section agree that the systematic review is complete and accurate?

The section agreed that the review was complete under the parameters of the inclusion and exclusion criteria. It is important to recognize a limitation of this review was that the outcomes were assessing a time-oriented process to retreatment. Ultimately this is a prosthetic question. Therefore, need for retreatment equals failure. The primary outcome evaluated was implant retention or fixed partial denture survival. In most instances the study did not define success criteria even though "success" was reported. The lack of consistency forces this process to accept the criteria used by the respective author (and the editorial process).

There were attempts made to address the secondary outcomes such as bone loss, caries, etc. But the section found only a few studies systematically reported on these key features, so it was necessary to revert to the simple criteria of success or survival.

2. Has any new information been generated or discovered since the review cut-off date?

An online search was performed during the session in addition to the preconference updated search. Five articles were identified and printed; each was assigned to paired section members who provided an assessment for inclusion. If found to meet the inclusion criteria, data extraction would be performed. Focus was on the potential impact and possible modification to the conclusions of the review article. The section found there were new published studies since May 2005 but none of the cited studies were of significant size or outcomes that would influence the conclusions of the review. These studies were:

- Romeo E. Lops D, Amorfini L, Chiapasco M, Ghisolfi M, Vogel G. Clinical and radiographic evaluation of small-diameter (3.3-mm) implants followed for 1–7 years: A longitudinal study. Clin Oral Implants Res 2006;17:139–148. The section could not distinguish between single-tooth versus implant FPDs in this study. There was also a dilemma that survival was cited as being less than success. Therefore, the section decided to exclude this study.

- Elkhoury JS, McGlumphy EA, Tatakis DN, Beck FM. Clinical parameters associated with success and failure of single-tooth titanium plasma-sprayed cylindric implants under stricter criteria: A 5-year retrospective study. Int J Oral Maxillofac Implants 2005;20:687–694. The section found that this study was not based on original research but was a retrospective survey of a larger prospective study. Therefore, the section decided to exclude this study.

- Lindeboom JA, Frenken JW, Dubois L, Frank M, Abbink I, Kroon FH. Immediate loading versus immediate provisionalization of maxillary single-tooth replacement: A prospective randomized study with BioComp implants. J Oral Maxillofac Surg 2006;64:936–942. The section found that this study was only from 6 months to 1 year follow-up. Therefore, the section decided to exclude this study.

- Wennstrom JL, Ekestubbe A, Grondahl K, Karlsson S, Lindhe J. Implant-supported single-tooth restorations: A 5-year prospective study. J Clin Periodontol 2005;32:567–574. The section found that this study was eligible for inclusion (40 subjects, 45 implants, 40 in maxillae and 5 in mandibles, up to 5-year outcomes).

- De Backer H, Van Maele G, De Moor N, van den Berghe L, De Boever J. A 20-year retrospective study of fixed partial dentures. Int J Prosthodont 2006;19:143–153. The section found this to be a 20-year follow-up from a predoctoral dental student clinic (193 patients, 322 FPDs). There was no life table data presentation, making data retrieval impossible. Also, the sample size was small relative to the overall pooled sample of 6,000 FPDs; therefore, inclusion of this study would have little impact on the conclusions of the review.

3. Does the section agree with the interpretation and conclusion of the reviewers?

The section found there was a conclusion that was not supported by the data. The conclusion was a subjective statement that implants fail early and fixed prostheses fail later. Implant-supported crown studies simply do not follow clinical performance for time periods that were similar to the studies following FPDs. The ISC studies were typically up to 6 years in duration, while FPD studies extended to more than 10 years. ISC research was a mixture of prospective and retrospective studies, while FPD data were retrospective in nature. The conclusion was therefore withdrawn.

4. What further research needs to be done relative to the PICO question?

The section concluded that additional research is needed to identify diagnostic and outcome variables (clinical and patient-specific): clear clinical success and survival *clinical criteria* coupled with relevant *patient-specific risk factors* (eg, psychological; economic; masticatory; genetic/anatomic/biologic; structural; QOL, etc) must be developed. A method to obtain these variables may be the goal of a future consensus conference. Different studies had different levels of outcome variance.

The section agreed that research is needed to identify variables (confounders) that can be explanatory for the variance observed in clinical trials.

The section felt there must be a standard template for data collection, presentation, and publication. This would not prevent the ability of clinical case-series to be a part of the literature. A consensus conference may be needed to obtain this template. The section report calls for increased diligence on the part of authors to submit data outcomes, relative to specific timepoints, that will allow future extraction and pooling of data in systematic reviews. This will assist clinicians to continue to manage implant patients over the long-term for those patients being consistently reevaluated. Journal editors are encouraged to continue to accept manuscripts describing ongoing systematic recall of patients. Finally, the section felt *comparative studies* of dental outcomes relative to implant restorations are needed. Examples would be investigator-initiated multicenter trials, NIH, industry-based consortiums, etc.

5. How can the information from the systematic review be applied for patient management?

The section felt application to patient management will be used to identify the strengths and weaknesses of each therapy. Patients should be advised of the significant difference in outcomes between resin-bonded FPDs and conventional FPDs or single-tooth implant restorations. The section felt it was important that based on the implant systems included in this review, patients may be advised that there is little variability in implant survival. The section concluded that this assessment will assist in the development of patient-specific factors and thus assist in the formulation of a treatment decision tree.

1 ISC INCLUSION LIST

16. Andersson B. Implants for single-tooth replacement. A clinical and experimental study on the Brånemark CeraOne System. Swed Dent J Suppl 1995;108:1–41.
19. Andersson B, Odman P, Lindvall AM, Brånemark PI. Five-year prospective study of prosthodontic and surgical single-tooth implant treatment in general practices and at a specialist clinic. Int J Prosthodont 1998;11:351–355.
18. Andersson B, Odman P, Lindvall AM, Brånemark PI. Cemented single crowns on osseointegrated implants after 5 years: Results from a prospective study on CeraOne. Int J Prosthodont 1998;11:212–218.
20. Andersson B, Taylor A, Lang BR, et al. Alumina ceramic implant abutments used for single-tooth replacement: A prospective 1- to 3-year multicenter study. Int J Prosthodont 2001;14:432–438.
21. Andersson L, Emami-Kristiansen Z, Hogstrom J. Single-tooth implant treatment in the anterior region of the maxilla for treatment of tooth loss after trauma: A retrospective clinical and interview study. Dent Traumatol 2003;19:126–131.
22. Avivi-Arber L, Zarb GA. Clinical effectiveness of implant-supported single-tooth replacement: The Toronto Study. Int J Oral Maxillofac Implants 1996;11:311–321.
23. Balshi TJ, Hernandez RE, Pryszlak MC, Rangert B. A comparative study of one implant versus two replacing a single molar. Int J Oral Maxillofac Implants 1996;11:372–378.
25. Becker W, Becker BE. Replacement of maxillary and mandibular molars with single endosseous implant restorations: A retrospective study. J Prosthet Dent 1995;74:51–55.
26. Becker W, Becker BE, Alsuwyed A, Al-Mubarak S. Long-term evaluation of 282 implants in maxillary and mandibular molar positions: A prospective study. J Periodontol 1999;70:896–901.
30. Bianco G, Di Raimondo R, Luongo G, et al. Osseointegrated implant for single-tooth replacement: A retrospective multicenter study on routine use in private practice. Clin Implant Dent Relat Res 2000;2:152–158.
42. Cooper L, Felton DA, Kugelberg CF, et al. A multicenter 12-month evaluation of single-tooth implants restored 3 weeks after 1-stage surgery. Int J Oral Maxillofac Implants 2001;16:182–192.
184. Covani U, Bortolaia C, Barone A, Sbordone L. Bucco-lingual crestal bone changes after immediate and delayed implant placement. J Periodontol 2004;75:1605–1612.
185. Davis DM, Watson RM, Packer ME. Single tooth crowns supported on hydroxyapatite coated endosseous dental implants: A prospective 5-year study on twenty subjects. Int Dent J 2004;54:201–205.
52. Deporter DA, Todescan R, Watson PA, Pharoah M, Levy D, Nardini K. Use of the Endopore dental implant to restore single teeth in the maxilla: Protocol and early results. Int J Oral Maxillofac Implants 1998;13:263–272.
55. Ekfeldt A, Carlsson GE, Borjesson G. Clinical evaluation of single-tooth restorations supported by osseointegrated implants: A retrospective study. Int J Oral Maxillofac Implants 1994;9:179–183.
57. Engquist B, Nilson H, Astrand P. Single-tooth replacement by osseointegrated Brånemark implants. A retrospective study of 82 implants. Clin Oral Implants Res 1995;6:238–245.
65. Gibbard LL, Zarb G. A 5-year prospective study of implant-supported single-tooth replacements. J Can Dent Assoc 2002;68:110–116.
186. Gotfredsen K. A 5-year prospective study of single-tooth replacements supported by the Astra Tech implant: A pilot study. Clin Implant Dent Relat Res 2004;6:1–8.
70. Groisman M, Ferreira HM, Frossard WM, de Menezes Filho LM, Harari ND. Clinical evaluation of hydroxyapatite-coated single-tooth implants: A 5-year retrospective study. Pract Proced Aesthet Dent 2001;13:355–360.
71. Groisman M, Frossard WM, Ferreira HM, de Menezes Filho LM, Touati B. Single-tooth implants in the maxillary incisor region with immediate provisionalization: 2-year prospective study. Pract Proced Aesthet Dent 2003;15:115–122, 124.
74. Haas R, Polak C, Furhauser R, Mailath-Pokorny G, Dortbudak O, Watzek G. A long-term follow-up of 76 Brånemark single-tooth implants. Clin Oral Implants Res 2002;13:38–43.
76. Henry PJ, Laney WR, Jemt T, et al. Osseointegrated implants for single-tooth replacement: A prospective 5-year multicenter study. Int J Oral Maxillofac Implants 1996;11:450–455.
78. Jemt T, Lekholm U, Grondahl K. 3-year follow-up study of early single implant restorations ad modum Brånemark. Int J Periodontics Restorative Dent 1990;10:340–349.
80. Jemt T, Pettersson P. A 3-year follow-up study on single implant treatment. J Dent 1993;21:203–208.
84. Johnson RH, Persson GR. A 3-year prospective study of a single-tooth implant—Prosthodontic complications. Int J Prosthodont 2001;14:183–189.
86. Kan JY, Rungcharassaeng K, Lozada J. Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective study. Int J Oral Maxillofac Implants 2003;18:31–39.
87. Karlsson U, Gotfredsen K, Olsson C. Single-tooth replacement by osseointegrated Astra Tech dental implants: A 2-year report. Int J Prosthodont 1997;10:318–324.
88. Kemppainen P, Eskola S, Ylipaavalniemi P. A comparative prospective clinical study of two single-tooth implants: A preliminary report of 102 implants. J Prosthet Dent 1997;77:382–387.
89. Krennmair G, Schmidinger S, Waldenberger O. Single-tooth replacement with the Frialit-2 system: A retrospective clinical analysis of 146 implants. Int J Oral Maxillofac Implants 2002;17:78–85.
92. Laney WR, Jemt T, Harris D, et al. Osseointegrated implants for single-tooth replacement: Progress report from a multicenter prospective study after 3 years. Int J Oral Maxillofac Implants 1994;9:49–54.
96. Levine RA, Clem D, Beagle J, et al. Multicenter retrospective analysis of the solid-screw ITI implant for posterior single-tooth replacements. Int J Oral Maxillofac Implants 2002;17:550–556.
104. Mangano C, Bartolucci EG. Single tooth replacement by Morse taper connection implants: A retrospective study of 80 implants. Int J Oral Maxillofac Implants 2001;16:675–680.
106. Mayer TM, Hawley CE, Gunsolley JC, Feldman S. The single-tooth implant: A viable alternative for single-tooth replacement. J Periodontol 2002;73:687–693.
109. McMillan AS, Allen PF, Bin Ismail I. A retrospective multicenter evaluation of single tooth implant experience at three centers in the United Kingdom. J Prosthet Dent 1998;79:410–414.
115. Muftu A, Chapman RJ. Replacing posterior teeth with free-standing implants: Four-year prosthodontic results of a prospective study. J Am Dent Assoc 1998;129:1097–1102.
116. Naert I, Koutsikakis G, Duyck J, Quirynen M, Jacobs R, van Steenberghe D. Biologic outcome of single-implant restorations as tooth replacements: A long-term follow-up study. Clin Implant Dent Relat Res 2000;2:209–218.
127. Norton MR. A short-term clinical evaluation of immediately restored maxillary TiOblast single-tooth implants. Int J Oral Maxillofac Implants 2004;19:274–281.

131. Palmer RM, Palmer PJ, Smith BJ. A 5-year prospective study of Astra single tooth implants. Clin Oral Implants Res 2000;11:179–182.
133. Polizzi G, Fabbro S, Furri M, Herrmann I, Squarzoni S. Clinical application of narrow Brånemark System implants for single-tooth restorations. Int J Oral Maxillofac Implants 1999;14:496–503.
134. Polizzi G, Rangert B, Lekholm U, Gualini F, Lindstrom H. Brånemark System Wide Platform implants for single molar replacement: Clinical evaluation of prospective and retrospective materials. Clin Implant Dent Relat Res 2000;2:61–69.
136. Priest G. Single-tooth implants and their role in preserving remaining teeth: A 10-year survival study. Int J Oral Maxillofac Implants 1999;14:181–188.
138. Proussaefs P, Kan J, Lozada J, Kleinman A, Farnos A. Effects of immediate loading with threaded hydroxyapatite-coated root-form implants on single premolar replacements: A preliminary report. Int J Oral Maxillofac Implants 2002;17: 567–572.
144. Romanos GE, Nentwig GH. Single molar replacement with a progressive thread design implant system: A retrospective clinical report. Int J Oral Maxillofac Implants 2000;15:831–836.
145. Romeo E, Chiapasco M, Ghisolfi M, Vogel G. Long-term clinical effectiveness of oral implants in the treatment of partial edentulism. Seven-year life table analysis of a prospective study with ITI dental implants system used for single-tooth restorations. Clin Oral Implants Res 2002;13:133–143.
146. Romeo E, Lops D, Margutti E, Ghisolfi M, Chiapasco M, Vogel G. Long-term survival and success of oral implants in the treatment of full and partial arches: A 7-year prospective study with the ITI dental implant system. Int J Oral Maxillofac Implants 2004;19:247–259.
150. Scheller H, Urgell JP, Kultje C, et al. A 5-year multicenter study on implant-supported single crown restorations. Int J Oral Maxillofac Implants 1998;13:212–218.
151. Schmitt A, Zarb GA. The longitudinal clinical effectiveness of osseointegrated dental implants for single-tooth replacement. Int J Prosthodont 1993;6:197–202.
152. Scholander S. A retrospective evaluation of 259 single-tooth replacements by the use of Brånemark implants. Int J Prosthodont 1999;12:483–491.
153. Schwartz-Arad D, Samet N. Single tooth replacement of missing molars: A retrospective study of 78 implants. J Periodontol 1999;70:449–454.
171. Vigolo P, Givani A. Clinical evaluation of single-tooth mini-implant restorations: A five-year retrospective study. J Prosthet Dent 2000;84:50–54.
172. Vigolo P, Givani A, Majzoub Z, Cordioli G. Cemented versus screw-retained implant-supported single-tooth crowns: A 4-year prospective clinical study. Int J Oral Maxillofac Implants 2004;19:260–265.
174. Wannfors K, Smedberg JI. A prospective clinical evaluation of different single-tooth restoration designs on osseointegrated implants. A 3-year follow-up of Brånemark implants. Clin Oral Implants Res 1999;10:453–458.
175. Watson CJ, Tinsley D, Ogden AR, Russell JL, Mulay S, Davison EM. A 3 to 4 year study of single tooth hydroxylapatite coated endosseous dental implants. Br Dent J 1999;187:90–94.
176. Wennstrom JL, Ekestubbe A, Grondahl K, Karlsson S, Lindhe J. Implant-supported single-tooth restorations: A 5-year prospective study. J Clin Periodontol 2005;32:567–574.

2 FPD INCLUSION LIST

191. Aquilino SA, Shugars DA, Bader JD, White BA. Ten-year survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. J Prosthet Dent 2001;85:455–460.
198. Barrack G, Bretz WA. A long-term prospective study of the etched-cast restoration. Int J Prosthodont 1993;6:428–434.
200. Behr M, Leibrock A, Stich W, Rammelsberg P, Rosentritt M, Handel G. Adhesive-fixed partial dentures in anterior and posterior areas. Results of an on-going prospective study begun in 1985. Clin Oral Investig 1998;2:31–35.
204. Berekally TL, Smales RJ. A retrospective clinical evaluation of resin-bonded bridges inserted at the Adelaide Dental Hospital. Aust Dent J 1993;38:85–96.
207. Besimo C, Gachter M, Jahn M, Hassell T. Clinical performance of resin-bonded fixed partial dentures and extracoronal attachments for removable prostheses. J Prosthet Dent 1997;78:465–471.
213. Boening KW. Clinical performance of resin-bonded fixed partial dentures. J Prosthet Dent 1996;76:39–44.
231. Cheung GS, Dimmer A, Mellor R, Gale M. A clinical evaluation of conventional bridgework. J Oral Rehabil 1990;17:131–136.
235. Corrente G, Vergnano L, Re S, Cardaropoli D, Abundo R. Resin-bonded fixed partial dentures and splints in periodontally compromised patients: A 10-year follow-up. Int J Periodontics Restorative Dent 2000;20:628–636.
237. Creugers NH, Snoek PA, van 't Hof MA, Kayser AF. Clinical performance of resin-bonded bridges: A 5-year prospective study. Part III: Failure characteristics and survival after rebonding. J Oral Rehabil 1990;17:179–186.
238. De Kanter RJ, Creugers NH, Verzijden CW, van 't Hof MA. A five-year multi-practice clinical study on posterior resin-bonded bridges. J Dent Res 1998;77:609–614.
247. Ericson G, Nilson H, Bergman B. Cross-sectional study of patients fitted with fixed partial dentures with special reference to the caries situation. Scand J Dent Res 1990;98:8–16.
250. Fayyad MA, al-Rafee MA. Failure of dental bridges. II. Prevalence of failure and its relation to place of construction. J Oral Rehabil 1996;23:438–440.
260. Glantz PO, Nilner K, Jendresen MD, Sundberg H. Quality of fixed prosthodontics after twenty-two years. Acta Odontol Scand 2002;60:213–218.
274. Hochman N, Mitelman L, Hadani PE, Zalkind M. A clinical and radiographic evaluation of fixed partial dentures (FPDs) prepared by dental school students: A retrospective study. J Oral Rehabil 2003;30:165–170.
278. Holm C, Tidehag P, Tillberg A, Molin M. Longevity and quality of FPDs: A retrospective study of restorations 30, 20, and 10 years after insertion. Int J Prosthodont 2003;16:283–289.
289. Karlsson S. Failures and length of service in fixed prosthodontics after long-term function. A longitudinal clinical study. Swed Dent J 1989;13:185–192.
293. Kellett M, Verzijden CW, Smith GA, Creugers NH. A multicentered clinical study on posterior resin-bonded bridges: The 'Manchester trial'. J Dent 1994;22:208–212.
296. Kerschbaum T, Haastert B, Marinello CP. Risk of debonding in three-unit resin-bonded fixed partial dentures. J Prosthet Dent 1996;75:248–253.
299. Ketabi AR, Kaus T, Herdach F, et al. Thirteen-year follow-up study of resin-bonded fixed partial dentures. Quintessence Int 2004;35:407–410.
312. Leempoel PJ, Kayser AF, Van Rossum GM, de Haan AF. The survival rate of bridges. A study of 1674 bridges in 40 Dutch general practices. J Oral Rehabil 1995;22:327–330.

318. Libby G, Arcuri MR, LaVelle WE, Hebl L. Longevity of fixed partial dentures. J Prosthet Dent 1997;78:127–131.
340. Mudassir A, Aboush YE, Hosein M, Hosein T, Padihar I. Long-term clinical performance of resin-bonded fixed partial dentures placed in a developing country. J Prosthodont 1995;4:233–236.
343. Napankangas R, Salonen-Kemppi MA, Raustia AM. Longevity of fixed metal ceramic bridge prostheses: A clinical follow-up study. J Oral Rehabil 2002;29:140–145.
355. Palmqvist S, Swartz B. Artificial crowns and fixed partial dentures 18 to 23 years after placement. Int J Prosthodont 1993;6:279–285.
366. Priest G. An 11-year reevaluation of resin-bonded fixed partial dentures. Int J Periodontics Restorative Dent 1995;15:238–247.
368. Probster B, Henrich GM. 11-year follow-up study of resin-bonded fixed partial dentures. Int J Prosthodont 1997;10:259–268.
375. Rammelsberg P, Pospiech P, Gernet W. Clinical factors affecting adhesive fixed partial dentures: A 6-year study. J Prosthet Dent 1993;70:300–307.
377. Randow K, Glantz PO, Zoger B. Technical failures and some related clinical complications in extensive fixed prosthodontics. An epidemiological study of long-term clinical quality. Acta Odontol Scand 1986;44:241–255.
378. Raustia AM, Napankangas R, Salonen AM. Complications and primary failures related to fixed metal ceramic bridge prostheses made by dental students. J Oral Rehabil 1998;25:677–680.
380. Reuter JE, Brose MO. Failures in full crown retained dental bridges. Br Dent J 1984;157:61–63.
382. Roberts DH. The failure of retainers in bridge prostheses. An analysis of 2,000 retainers. Br Dent J 1970;128:117–124.
384. Samama Y. Fixed bonded prosthodontics: A 10-year follow-up report. Part II. Clinical assessment. Int J Periodontics Restorative Dent 1996;16:52–59.
390. Serdar-Cotert H, Ozturk B. Posterior bridges retained by resin-bonded cast metal inlay retainers: A report of 60 cases followed for 6 years. J Oral Rehabil 1997;24:697–704.
394. Shugars DA, Bader JD, White BA, Scurria MS, Hayden WJ Jr, Garcia RI. Survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. J Am Dent Assoc 1998;129:1089–1095.
397. Soderfeldt B, Palmqvist S. A multilevel analysis of factors affecting the longevity of fixed partial dentures, retainers and abutments. J Oral Rehabil 1998;25:245–252.
407. Sundh B, Odman P. A study of fixed prosthodontics performed at a university clinic 18 years after insertion. Int J Prosthodont 1997;10:513–519.
416. Valderhaug J. A 15-year clinical evaluation of fixed prosthodontics. Acta Odontol Scand 1991;49:35–40.
423. Verzijden CW, Creugers NH, Mulder J. A multi-practice clinical study on posterior resin-bonded bridges: A 2.5-year interim report. J Dent Res 1994;73:529–535.
429. Walter M, Reppel PD, Boning K, Freesmeyer WB. Six-year follow-up of titanium and high-gold porcelain-fused-to-metal fixed partial dentures. J Oral Rehabil 1999;26:91–96.
434. Walton TR. An up to 15-year longitudinal study of 515 metal-ceramic FPDs: Part 2. Modes of failure and influence of various clinical characteristics. Int J Prosthodont 2003;16:177–182.
446. Zalkind M, Ever-Hadani P, Hochman N. Resin-bonded fixed partial denture retention: A retrospective 13-year follow-up. J Oral Rehabil 2003;30(10):971–977.

3 ISC EXCLUSION LIST

13. Abboud M, Koeck B, Stark H, Wahl G, Paillon R. Immediate loading of single-tooth implants in the posterior region. Int J Oral Maxillofac Implants 2005;20:61–68.
14. Andersen E, Saxegaard E, Knutsen BM, Haanaes HR. A prospective clinical study evaluating the safety and effectiveness of narrow-diameter threaded implants in the anterior region of the maxilla. Int J Oral Maxillofac Implants 2001;16:217–224.
15. Andersen E, Haanaes HR, Knutsen BM. Immediate loading of single-tooth ITI implants in the anterior maxilla: A prospective 5-year pilot study. Clin Oral Implants Res 2002;13:281–287.
17. Andersson B, Odman P, Lindvall AM, Brånemark PI. Surgical and prosthodontic training of general practitioners for single tooth implants: A study of treatments performed at four general practitioners' offices and at a specialist clinic after 2 years. J Oral Rehabil 1995;22:543–548.
24. Bambini F, Lo Muzio L, Procaccini M. Retrospective analysis of the influence of abutment structure design on the success of implant unit. A 3-year controlled follow-up study. Clin Oral Implants Res 2001;12:319–324.
27. Behneke A, Behneke N, d'Hoedt B, Wagner W. Hard and soft tissue reactions to ITI screw implants: 3-year longitudinal results of a prospective study. Int J Oral Maxillofac Implants 1997;12:749–757.
28. Bender MF. Posterior implant-supported single crowns: A new treatment approach [in German]. Int J Dent Symp 1994;2:65–69.
29. Bianchi AE, Sanfilippo F. Single-tooth replacement by immediate implant and connective tissue graft: A 1–9-year clinical evaluation. Clin Oral Implants Res 2004;15:269–277.
31. Brocard D, Barthet P, Baysse E, et al. A multicenter report on 1,022 consecutively placed ITI implants: A 7-year longitudinal study. Int J Oral Maxillofac Implants 2000;15:691–700.
32. Calandriello R, Tomatis M, Vallone R, Rangert B, Gottlow J. Immediate occlusal loading of single lower molars using Brånemark System Wide-Platform TiUnite implants: An interim report of a prospective open-ended clinical multicenter study. Clin Implant Dent Relat Res 2003;5(suppl 1):74–80.
33. Callan D, Hahn J, Hebel K, et al. Retrospective multicenter study of an anodized, tapered, diminishing thread implant: Success rate at exposure. Implant Dent 2000;9:329–336.
34. Carlson B, Carlsson GE. Prosthodontic complications in osseointegrated dental implant treatment. Int J Oral Maxillofac Implants 1994;9:90–94.
35. Carr AB, Choi YG, Eckert SE, Desjardins RP. Retrospective cohort study of the clinical performance of 1-stage dental implants. Int J Oral Maxillofac Implants 2003;18:399–405.
36. Carter GM, Hunter KM. Implant-based treatment for the loss of a single tooth. N Z Dent J 1994;90:150–156.
37. Carter GM, Hunter KM. Six years' experience with Brånemark osseointegrated implants. N Z Dent J 1995;91:44–48.
38. Chang M, Odman PA, Wennstrom JL, Andersson B. Esthetic outcome of implant-supported single-tooth replacements assessed by the patient and by prosthodontists. Int J Prosthodont 1999;12:335–341.
39. Chang M, Wennstrom JL, Odman P, Andersson B. Implant supported single-tooth replacements compared to contralateral natural teeth. Crown and soft tissue dimensions. Clin Oral Implants Res 1999;10:185–194.
40. Chaushu G, Chaushu S, Tzohar A, Dayan D. Immediate loading of single-tooth implants: Immediate versus non-immediate implantation. A clinical report. Int J Oral Maxillofac Implants 2001;16:267–272.

41. Choquet V, Hermans M, Adriaenssens P, Daelemans P, Tarnow DP, Malevez C. Clinical and radiographic evaluation of the papilla level adjacent to single-tooth dental implants. A retrospective study in the maxillary anterior region. J Periodontol 2001;72:1364–1371.
43. Cordioli G, Castagna S, Consolati E. Single-tooth implant rehabilitation: A retrospective study of 67 implants. Int J Prosthodont 1994;7:525–531.
2. Creugers NH, Kreulen CM, Snoek PA, de Kanter RJ. A systematic review of single-tooth restorations supported by implants. J Dent 2000;28:209–217.
44. Creugers NH, Kreulen CM. Systematic review of 10 years of systematic reviews in prosthodontics. Int J Prosthodont 2003;16:123–127.
45. Cune MS, van Rossen IP, de Putter C, Wils RP. A clinical retrospective evaluation of FA/HA coated (Biocomp) dental implants. Results after 1 year. Clin Oral Implants Res 1996;7:345–353.
46. Cune MS, de Putter C, Vos A, Wils RP. Clinical evaluation of the Biocomp-implant system. Results after 1, 3 and 5 years in a general practice [in Dutch]. Ned Tijdschr Tandheelkd 2001;108:5–10.
47. Davarpanah M, Martinez H, Etienne D, et al. A prospective multicenter evaluation of 1,583 3i implants: 1- to 5-year data. Int J Oral Maxillofac Implants 2002;17:820–828.
48. de Wijs FL, Cune MS, van Rossen IP, de Putter C. Delayed implants in the anterior maxilla with the IMZ-implant system: A radiographical evaluation. J Oral Rehabil 1995;22:797–802.
49. de Wijs FL, Cune MS. Immediate labial contour restoration for improved esthetics: A radiographic study on bone splitting in anterior single-tooth replacement. Int J Oral Maxillofac Implants 1997;12:686–696.
50. Degidi M, Piattelli A. Immediate functional and non-functional loading of dental implants: A 2- to 60-month follow-up study of 646 titanium implants. J Periodontol 2003;74:225–241.
51. Degidi M, Piattelli A. Comparative analysis study of 702 dental implants subjected to immediate functional loading and immediate nonfunctional loading to traditional healing periods with a follow-up of up to 24 months. Int J Oral Maxillofac Implants 2005;20:99–107.
53. Deporter D, Pilliar RM, Todescan R, Watson P, Pharoah M. Managing the posterior mandible of partially edentulous patients with short, porous-surfaced dental implants: Early data from a clinical trial. Int J Oral Maxillofac Implants 2001;16:653–658.
54. Duncan JP, Nazarova E, Vogiatzi T, Taylor TD. Prosthodontic complications in a prospective clinical trial of single-stage implants at 36 months. Int J Oral Maxillofac Implants 2003;18:561–565.
56. el-Far MM. Tissue reaction at osseointegrated single implants with self-holding tapers abutments. A preliminary report of 45 Bicon Implants. Egypt Dent J 1995;41:1429–1434.
58. Ericsson I, Nilson H, Lindh T, Nilner K, Randow K. Immediate functional loading of Brånemark single tooth implants. An 18 months' clinical pilot follow-up study. Clin Oral Implants Res 2000;11:26–33.
59. Esposito M, Ekestubbe A, Grondahl K. Radiological evaluation of marginal bone loss at tooth surfaces facing single Brånemark implants. Clin Oral Implants Res 1993;4:151–157.
60. Evian CI, Emling R, Rosenberg ES, et al. Retrospective analysis of implant survival and the influence of periodontal disease and immediate placement on long-term results. Int J Oral Maxillofac Implants 2004;19:393–398.
61. Fugazzotto PA, Gulbransen HJ, Wheeler SL, Lindsay JA. The use of IMZ osseointegrated implants in partially and completely edentulous patients: Success and failure rates of 2,023 implant cylinders up to 60+ months in function. Int J Oral Maxillofac Implants 1993;8:617–621.
62. Fugazzotto PA, Beagle JR, Ganeles J, Jaffin R, Vlassis J, Kumar A. Success and failure rates of 9 mm or shorter implants in the replacement of missing maxillary molars when restored with individual crowns: Preliminary results 0 to 84 months in function. A retrospective study. J Periodontol 2004;75:327–332.
63. Gaggl A, Schultes G, Karcher H. Vertical alveolar ridge distraction with prosthetic treatable distractors: A clinical investigation. Int J Oral Maxillofac Implants 2000;15:701–710.
64. Giannopoulou C, Bernard JP, Buser D, Carrel A, Belser UC. Effect of intracrevicular restoration margins on peri-implant health: Clinical, biochemical, and microbiologic findings around esthetic implants up to 9 years. Int J Oral Maxillofac Implants 2003;18:173–181.
66. Glauser R, Ruhstaller P, Gottlow J, Sennerby L, Portmann M, Hammerle CH. Immediate occlusal loading of Brånemark TiUnite implants placed predominantly in soft bone: 1-year results of a prospective clinical study. Clin Implant Dent Relat Res 2003;5(suppl 1):47–56.
67. Glauser R, Sailer I, Wohlwend A, Studer S, Schibli M, Scharer P. Experimental zirconia abutments for implant-supported single-tooth restorations in esthetically demanding regions: 4-year results of a prospective clinical study. Int J Prosthodont 2004;17:285–290.
68. Goldstein M, Boyan BD, Schwartz Z. The palatal advanced flap: A pedicle flap for primary coverage of immediately placed implants. Clin Oral Implants Res 2002;13:644–650.
69. Gomez-Roman G, Kruppenbacher M, Weber H, Schulte W. Immediate postextraction implant placement with root-analog stepped implants: Surgical procedure and statistical outcome after 6 years. Int J Oral Maxillofac Implants 2001;16:503–513.
3. Goodacre CJ, Bernal G, Rungcharassaeng K, Kan JY. Clinical complications with implants and implant prostheses. J Prosthet Dent 2003;90:121–132.
72. Grunder U, Gaberthuel T, Boitel N, et al. Evaluating the clinical performance of the Osseotite implant: Defining prosthetic predictability. Compend Contin Educ Dent 1999;20:628–633, 636, 638–640.
73. Grunder U. Stability of the mucosal topography around single-tooth implants and adjacent teeth: 1-year results. Int J Periodontics Restorative Dent 2000;20:11–17.
75. Henry PJ, Rosenberg IR, Bills IG, et al. Osseointegrated implants for single tooth replacement in general practice: A 1-year report from a multicentre prospective study. Aust Dent J 1995;40:173–181.
77. Huys LW. Replacement therapy and the immediate post-extraction dental implant. Implant Dent 2001;10:93–102.
79. Jemt T, Laney WR, Harris D, et al. Osseointegrated implants for single tooth replacement: A 1-year report from a multicenter prospective study. Int J Oral Maxillofac Implants 1991;6:29–36.
81. Jemt T. Customized titanium single-implant abutments: 2-year follow-up pilot study. Int J Prosthodont 1998;11:312–316.
82. Jemt T. Restoring the gingival contour by means of provisional resin crowns after single-implant treatment. Int J Periodontics Restorative Dent 1999;19:20–29.
83. Johnson RH, Persson GR. Evaluation of a single-tooth implant. Int J Oral Maxillofac Implants 2000;15:396–404.
85. Jorneus L, Jemt T, Carlsson L. Loads and designs of screw joints for single crowns supported by osseointegrated implants. Int J Oral Maxillofac Implants 1992;7:353–359.

90. Kucey BK. Implant placement in prosthodontics practice: A five-year retrospective study. J Prosthet Dent 1997;77:171–176.
91. Lambrecht JT, Filippi A, Kunzel AR, Schiel HJ. Long-term evaluation of submerged and nonsubmerged ITI solid-screw titanium implants: A 10-year life table analysis of 468 implants. Int J Oral Maxillofac Implants 2003;18:826–834.
93. Lazzara RJ, Porter SS, Testori T, Galante J, Zetterqvist L. A prospective multicenter study evaluating loading of osseotite implants two months after placement: One-year results. J Esthet Dent 1998;10:280–289.
94. Levine RA, Clem DS 3rd, Wilson TG Jr, Higginbottom F, Saunders SL. A multicenter retrospective analysis of the ITI implant system used for single-tooth replacements: Preliminary results at 6 or more months of loading. Int J Oral Maxillofac Implants 1997;12:237–242.
95. Levine RA, Clem DS 3rd, Wilson TG Jr, Higginbottom F, Solnit G. Multicenter retrospective analysis of the ITI implant system used for single-tooth replacements: Results of loading for 2 or more years. Int J Oral Maxillofac Implants 1999;14:516–520.
97. Lew I, Maresca MJ, Greene D. A fifteen year report of a single tooth replacement system. J Oral Implantol 1979;8:534–552.
98. Lill W, Thornton B, Reichsthaler J, Schneider B. Statistical analyses on the success potential of osseointegrated implants: A retrospective single-dimension statistical analysis. J Prosthet Dent 1993;69:176–185.
1. Lindh T, Gunne J, Tillberg A, Molin M. A meta-analysis of implants in partial edentulism. Clin Oral Implants Res 1998;9:80–90.
99. Lindhe J, Berglundh T. The interface between the mucosa and the implant. Periodontol 2000 1998;17:47–54.
100. Lorenzoni M, Pertl C, Zhang K, Wimmer G, Wegscheider WA. Immediate loading of single-tooth implants in the anterior maxilla. Preliminary results after one year. Clin Oral Implants Res 2003;14:180–187.
101. Malevez C, Hermans M, Daelemans P. Marginal bone levels at Brånemark system implants used for single tooth restoration. The influence of implant design and anatomical region. Clin Oral Implants Res 1996;7:162–169.
102. Malmqvist JP, Sennerby L. Clinical report on the success of 47 consecutively placed Core-Vent implants followed from 3 months to 4 years. Int J Oral Maxillofac Implants 1990;5:53–60.
103. Malo P, Friberg B, Polizzi G, Gualini F, Vighagen T, Rangert B. Immediate and early function of Brånemark System implants placed in the esthetic zone: A 1-year prospective clinical multicenter study. Clin Implant Dent Relat Res 2003;5(suppl 1):37–46.
105. Mau J. On statistics of success and loss for dental implants. Int Dent J 1993;43:254–261.
107. Mazor Z, Peleg M, Gross M. Sinus augmentation for single-tooth replacement in the posterior maxilla: A 3-year follow-up clinical report. Int J Oral Maxillofac Implants 1999;14:55–60.
108. Mazor Z, Cohen DK. Preliminary 3-dimensional surface texture measurement and early loading results with a microtextured implant surface. Int J Oral Maxillofac Implants 2003;18:729–738.
110. Mengel R, Stelzel M, Hasse C, Flores-de-Jacoby L. Osseointegrated implants in patients treated for generalized severe adult periodontitis. An interim report. J Periodontol 1996;67:782–787.
111. Mericske-Stern R, Aerni D, Geering AH, Buser D. Long-term evaluation of non-submerged hollow cylinder implants. Clinical and radiographic results. Clin Oral Implants Res 2001;12:252–259.
112. Moberg LE, Kondell PA, Kullman L, Heimdahl A, Gynther GW. Evaluation of single-tooth restorations on ITI dental implants. A prospective study of 29 patients. Clin Oral Implants Res 1999;10:45–53.
113. Morris HF, Ochi S. Influence of research center on overall survival outcomes at each phase of treatment. Ann Periodontol 2000;5:129–136.
114. Morris HF, Winkler S, Ochi S. A 48-month multicentric clinical investigation: Implant design and survival. J Oral Implantol. 2001;27:180–186.
117. Naert I, Koutsikakis G, Duyck J, Quirynen M, Jacobs R, van Steenberghe D. Biologic outcome of implant-supported restorations in the treatment of partial edentulism. Part I: A longitudinal clinical evaluation. Clin Oral Implants Res 2002;13:381–389.
119. Nedir R, Bischof M, Briaux JM, Beyer S, Szmukler-Moncler S, Bernard JP. A 7-year life table analysis from a prospective study on ITI implants with special emphasis on the use of short implants. Results from a private practice. Clin Oral Implants Res 2004;15:150–157.
120. Nentwig GH. Ankylos implant system: Concept and clinical application. J Oral Implantol 2004;30:171–177.
121. Nikellis I, Levi A, Nicolopoulos C. Immediate loading of 190 endosseous dental implants: A prospective observational study of 40 patient treatments with up to 2-year data. Int J Oral Maxillofac Implants 2004;19:116–123.
122. Nkenke E, Radespiel-Troger M, Wiltfang J, Schultze-Mosgau S, Winkler G, Neukam FW. Morbidity of harvesting of retromolar bone grafts: A prospective study. Clin Oral Implants Res 2002;13:514–521.
123. Noack N, Willer J, Hoffmann J. Long-term results after placement of dental implants: Longitudinal study of 1,964 implants over 16 years. Int J Oral Maxillofac Implants 1999;14:748–755.
124. Norton MR. The Astra Tech Single-Tooth Implant System: A report on 27 consecutively placed and restored implants. Int J Periodontics Restorative Dent 1997;17:574–583.
125. Norton MR. Marginal bone levels at single tooth implants with a conical fixture design. The influence of surface macro- and microstructure. Clin Oral Implants Res 1998;9:91–99.
126. Norton MR. Single-tooth implant-supported restorations. Planning for an aesthetic and functional solution. Dent Update 2001;28:170–175.
128. Oates TW, West J, Jones J, Kaiser D, Cochran DL. Long-term changes in soft tissue height on the facial surface of dental implants. Implant Dent 2002;11:272–279.
129. Orenstein IH, Petrazzuolo V, Morris HF, Ochi S. Variables affecting survival of single-tooth hydroxyapatite-coated implants in anterior maxillae at 3 years. Ann Periodontol 2000;5:68–78.
130. Palmer RM, Smith BJ, Palmer PJ, Floyd PD. A prospective study of Astra single tooth implants. Clin Oral Implants Res 1997;8:173–179.
132. Parein AM, Eckert SE, Wollan PC, Keller EE. Implant reconstruction in the posterior mandible: A long-term retrospective study. J Prosthet Dent 1997;78:34–42.
135. Preiskel HW, Tsolka P. The DIA anatomic abutment system and telescopic prostheses: A clinical report. Int J Oral Maxillofac Implants 1997;12:628–633.
137. Priest G. Predictability of soft tissue form around single-tooth implant restorations. Int J Periodontics Restorative Dent 2003;23:19–27.
139. Proussaefs P, Lozada J. Immediate loading of hydroxyapatite-coated implants in the maxillary premolar area: Three-year results of a pilot study. J Prosthet Dent 2004;91:228–233.

140. Puchades-Roman L, Palmer RM, Palmer PJ, Howe LC, Ide M, Wilson RF. A clinical, radiographic, and microbiologic comparison of Astra Tech and Brånemark single tooth implants. Clin Implant Dent Relat Res 2000;2:78–84.
141. Raghoebar GM, Batenburg RH, Vissink A, Reintsema H. Augmentation of localized defects of the anterior maxillary ridge with autogenous bone before insertion of implants. J Oral Maxillofac Surg 1996;54:1180–1185.
142. Rocci A, Martignoni M, Gottlow J. Immediate loading in the maxilla using flapless surgery, implants placed in predetermined positions, and prefabricated provisional restorations: A retrospective 3-year clinical study. Clin Implant Dent Relat Res 2003;5(suppl 1):29–36.
143. Rodriguez AM, Orenstein IH, Morris HF, Ochi S. Survival of various implant-supported prosthesis designs following 36 months of clinical function. Ann Periodontol 2000;5:101–108.
147. Saadoun AP, Le Gall MG. An 8-year compilation of clinical results obtained with Steri-Oss endosseous implants. Compend Contin Educ Dent 1996;17:669–674.
148. Salonen MA, Oikarinen K, Virtanen K, Pernu H. Failures in the osseointegration of endosseous implants. Int J Oral Maxillofac Implants 1993;8:92–97.
149. Salvi GE, Gallini G, Lang NP. Early loading (2 or 6 weeks) of sandblasted and acid-etched (SLA) ITI implants in the posterior mandible. A 1-year randomized controlled clinical trial. Clin Oral Implants Res 2004;15:142–149.
154. Schwartz-Arad D, Grossman Y, Chaushu G. The clinical effectiveness of implants placed immediately into fresh extraction sites of molar teeth. J Periodontol 2000;71:839–844.
155. Scipioni A, Bruschi GB, Calesini G. The edentulous ridge expansion technique: A five-year study. Int J Periodontics Restorative Dent 1994;14:451–459.
156. Sethi A, Kaus T. Maxillary ridge expansion with simultaneous implant placement: 5-year results of an ongoing clinical study. Int J Oral Maxillofac Implants 2000;15:491–499.
157. Sethi A, Kaus T, Sochor P. The use of angulated abutments in implant dentistry: Five-year clinical results of an ongoing prospective study. Int J Oral Maxillofac Implants 2000;15:801–810.
158. Sethi A, Sochor P. The lateral fixation screw in implant dentistry. Eur J Prosthodont Restor Dent 2000;8:39–43.
159. Simon RL. Single implant-supported molar and premolar crowns: A ten-year retrospective clinical report. J Prosthet Dent 2003;90:517–521.
160. Singer A, Serfaty V. Cement-retained implant-supported fixed partial dentures: A 6-month to 3-year follow-up. Int J Oral Maxillofac Implants 1996;11:645–659.
161. Steveling H, Roos J, Rasmusson L. Maxillary implants loaded at 3 months after insertion: Results with Astra Tech implants after up to 5 years. Clin Implant Dent Relat Res 2001;3:120–124.
162. Stricker A, Voss PJ, Gutwald R, Schramm A, Schmelzeisen R. Maxillary sinus floor augmentation with autogenous bone grafts to enable placement of SLA-surfaced implants: Preliminary results after 15–40 months. Clin Oral Implants Res 2003;14:207–212.
163. Sullivan DY, Sherwood RL, Mai TN. Preliminary results of a multicenter study evaluating a chemically enhanced surface for machined commercially pure titanium implants. J Prosthet Dent 1997;78:379–386 [erratum 1998;79:365].
164. Sullivan DY, Sherwood RL, Porter SS. Long-term performance of Osseotite implants: A 6-year clinical follow-up. Compend Contin Educ Dent 2001;22:326–328, 330, 332–334.
165. Sulzer TH, Bornstein MM, Buser D. Indications for oral implantology in a referral clinic. A three-year retrospective analysis of 737 patients with 1176 implants [in German]. Schweiz Monatsschr Zahnmed 2004;114:444–450.
166. Testori T, Wiseman L, Woolfe S, Porter SS. A prospective multicenter clinical study of the Osseotite implant: Four-year interim report. Int J Oral Maxillofac Implants 2001;16:193–200.
167. Testori T, Del Fabbro M, Feldman S, et al. A multicenter prospective evaluation of 2-months loaded Osseotite implants placed in the posterior jaws: 3-year follow-up results. Clin Oral Implants Res 2002;13:154–161.
168. Thilander B, Odman J, Jemt T. Single implants in the upper incisor region and their relationship to the adjacent teeth. An 8-year follow-up study. Clin Oral Implants Res 1999;10:346–355.
169. Thilander B, Odman J, Lekholm U. Orthodontic aspects of the use of oral implants in adolescents: A 10-year follow-up study. Eur J Orthod 2001;23:715–731.
170. Vermylen K, Collaert B, Linden U, Bjorn AL, De Bruyn H. Patient satisfaction and quality of single-tooth restorations. Clin Oral Implants Res 2003;14:119–124.
173. Walther W, Klemke J, Worle M, Heners M. Implant-supported single-tooth replacements: Risk of implant and prosthesis failure. J Oral Implantol 1996;22:236–239.
177. Watson CJ, Tinsley D, Sharma S. Implant complications and failures: The single-tooth restoration. Dent Update 2000;27:35–38, 40, 42.
178. Weber HP, Buser D, Fiorellini JP, Williams RC. Radiographic evaluation of crestal bone levels adjacent to nonsubmerged titanium implants. Clin Oral Implants Res 1992;3:181–188.
179. Weng D, Jacobson Z, Tarnow D, et al. A prospective multicenter clinical trial of 3i machined-surface implants: Results after 6 years of follow-up. Int J Oral Maxillofac Implants 2003;18:417–423.
180. Widmark G, Friberg B, Johansson B, Sindet-Pedersen S, Taylor A. Mk III: A third generation of the self-tapping Brånemark System implant, including the new Stargrip internal grip design. A 1-year prospective four-center study. Clin Implant Dent Relat Res 2003;5:273–279.
181. Wohrle PS. Single-tooth replacement in the aesthetic zone with immediate provisionalization: Fourteen consecutive case reports. Pract Periodontics Aesthet Dent 1998;10:1107–1114.
182. Yi SW, Ericsson I, Kim CK, Carlsson GE, Nilner K. Implant-supported fixed prostheses for the rehabilitation of periodontally compromised dentitions: A 3-year prospective clinical study. Clin Implant Dent Relat Res 2001;3:125–134.
183. Zinsli B, Sagesser T, Mericske E, Mericske-Stern R. Clinical evaluation of small-diameter ITI implants: A prospective study. Int J Oral Maxillofac Implants 2004;19:92–99.

4 FPD EXCLUSION LIST

187. Altieri JV, Burstone CJ, Goldberg AJ, Patel AP. Longitudinal clinical evaluation of fiber-reinforced composite fixed partial dentures: A pilot study. J Prosthet Dent 1994;71:16–22.
188. Andersson B, Glauser R, Maglione M, Taylor A. Ceramic implant abutments for short-span FPDs: A prospective 5-year multicenter study. Int J Prosthodont 2003;16:640–646.
189. Andersson B, Scharer P, Simion M, Bergstrom C. Ceramic implant abutments used for short-span fixed partial dentures: A prospective 2-year multicenter study. Int J Prosthodont 1999;12:318–324.

190. Aparicio C, Perales P, Rangert B. Tilted implants as an alternative to maxillary sinus grafting: A clinical, radiologic, and periotest study. Clin Implant Dent Relat Res 2001;3:39–49.
192. Assemat-Tessandier X. Bonded bridges. Clinical application of the Maryland bridge for the restoration of posterior edentulousness [in French]. Inf Dent 1986;68:2317–2326.
193. Astrand P, Engquist B, Anzen B, et al. Nonsubmerged and submerged implants in the treatment of the partially edentulous maxilla. Clin Implant Dent Relat Res 2002;4:115–127.
194. Attard NJ, Zarb GA. Implant prosthodontic management of partially edentulous patients missing posterior teeth: The Toronto experience. J Prosthet Dent 2003;89:352–359.
195. Aydin MY, Kargul B. Glass-fiber reinforced composite in management of avulsed central incisor: A case report. J Dent Child (Chic) 2004;71:66–68.
196. Barrack G. Aesthetic partial-coverage dental restorations. Curr Opin Dent 1992;2:39–44.
197. Barrack G. The etched cast restoration—Clinical techniques and long-term results. Quintessence Int 1993;24:701–713.
199. Bassett JL. Replacement of missing mandibular lateral incisors with a single pontic all-ceramic prosthesis: A case report. Pract Periodontics Aesthet Dent 1997;9:455–461.
201. Behr M, Rosentritt M, Handel G. Fiber-reinforced composite crowns and FPDs: A clinical report. Int J Prosthodont 2003;16:239–243.
202. Berekally TL. Post-insertion sensitivity with a bonded etched cast metal prosthesis. Case report. Aust Dent J 1990;35:413–415.
203. Berekally TL, Makinson OF, Pietrobon RA. A microscopic examination of bond surfaces in failed electrolytically etched cast metal fixed prostheses. Aust Dent J 1993;38:229–235.
205. Berger RJ. The Maryland bridge signals a "new era" in restorative dentistry. NADL J 1982;29:11–13.
206. Bertelli E, Luzi P, Boracchini A, Ferrari M, Sforza V. Scanning electron microscopic findings on metal etching for a Maryland bridge (1) [in Italian]. Minerva Stomatol 1985;34:519–525.
207. Bertelli E, Luzi P, Borracchini A, Ferrari M, Sforza V. Scanning electron microscopy of the metal etching for the Maryland bridge. II [in Italian]. Minerva Stomatol 1986;35:731–737.
208. Besimo C. Resin-bonded fixed partial denture technique: Results of a medium-term clinical follow-up investigation. J Prosthet Dent 1993;69:144–148.
210. Black SM, Charlton G. Survival of crowns and bridges related to luting cements. Restorative Dent 1990;6:26–30.
211. Blatz MB. Long-term clinical success of all-ceramic posterior restorations. Quintessence Int 2002;33:415–426.
212. Block MS, Lirette D, Gardiner D, et al. Prospective evaluation of implants connected to teeth. Int J Oral Maxillofac Implants 2002;17:473–487.
214. Bohlsen F, Kern M. Clinical outcome of glass-fiber-reinforced crowns and fixed partial dentures: A three-year retrospective study. Quintessence Int 2003;34:493–496.
215. Botelho MG, Chan AW, Yiu EY, Tse ET. Longevity of two-unit cantilevered resin-bonded fixed partial dentures. Am J Dent 2002;15:295–299.
216. Botelho MG, Nor LC, Kwong HW, Kuen BS. Two-unit cantilevered resin-bonded fixed partial dentures—A retrospective, preliminary clinical investigation. Int J Prosthodont 2000;13:25–28.
217. Bourrelly MG. A bonded bridge using the University of Maryland technic [in French]. Rev Fr Prothes Dent 1984;(47):47–52.
218. Brooks JW, Twyman B, Wilcox E, Peters M. The Maryland bridge: Is it here to stay? Dent Lab Rev 1983;58:16, 18–19.
219. Budtz-Jorgensen E. Restoration of the partially edentulous mouth—A comparison of overdentures, removable partial dentures, fixed partial dentures and implant treatment. J Dent 1996;24:237–244.
220. Budtz-Jorgensen E, Isidor F. A 5-year longitudinal study of cantilevered fixed partial dentures compared with removable partial dentures in a geriatric population. J Prosthet Dent 1990;64:42–47.
221. Budtz-Jorgensen E, Isidor F, Karring T. Cantilevered fixed partial dentures in a geriatric population: Preliminary report. J Prosthet Dent 1985;54:467–473.
222. Buhler H. Evaluation of root-resected teeth. Results after 10 years. J Periodontol 1988;59:805–810.
223. Burgess JO, McCartney JG. Anterior retainer design for resin-bonded acid-etched fixed partial dentures. J Prosthet Dent 1989;61:433–436.
224. Burke TA, Litt JS, Fox MA. Linking public health and the health of the Chesapeake Bay. Environ Res 2000;82:143–149.
225. Butler BR. The Maryland bridge: Lifting large resin patterns. Quintessence Dent Technol 1984;8:373–375.
226. Cagidiaco D, Ferrari M, Cagidiaco MC. Which etching for improvement of the retention of the Maryland bridge. Chemically is better [in Italian]. Attual Dent 1986;2:8–9, 11.
227. Caltabiano M, Cicciu D, Verzi P. The importance of the Maryland bridge in orthognathodontics [in Italian]. Stomatol Mediterr 1987;7:352–364.
228. Carrese JA, Mullaney JL, Faden RR, Finucane TE. Planning for death but not serious future illness: Qualitative study of housebound elderly patients. BMJ 2002;325:125.
229. Chadwick B, Treasure E, Dummer P, et al. Challenges with studies investigating longevity of dental restorations—A critique of a systematic review. J Dent 2001;29:155–161.
230. Chafaie A, Portier R. Anterior fiber-reinforced composite resin bridge: A case report. Pediatr Dent 2004;26:530–534.
232. Clyde JS, Boyd T. The etched cast metal resin-bonded (Maryland) bridge: A clinical review. J Dent 1988;16:22–26.
233. Collesanto V, Pessina E, Piacentini C, Menghini P. The Maryland bridge: Scanning electron microscopy evaluation of an etching technic for the metal [in Italian]. G Stomatol Ortognatodonzia 1985;4:17–26.
234. Cordeiro PG, Santamaria E. A classification system and algorithm for reconstruction of maxillectomy and midfacial defects. Plast Reconstr Surg 2000;105:2331–2346.
236. Creugers NH, de Kanter RJ, Verzijden CW, van 't Hof MA. Five year survival of posterior adhesive bridges. Influence of bonding systems and tooth preparation [in Dutch]. Ned Tijdschr Tandheelkd 1999;106:250–253.
6. Creugers NH, Kayser AF, van 't Hof MA. A meta-analysis of durability data on conventional fixed bridges. Community Dent Oral Epidemiol 1994;22:448–452.
44. Creugers NH, Kreulen CM. Systematic review of 10 years of systematic reviews in prosthodontics. Int J Prosthodont 2003;16:123–127.
7. Creugers NH, van 't Hof MA. An analysis of clinical studies on resin-bonded bridges. J Dent Res 1991;70:146–149.
45. Cune MS, van Rossen IP, de Putter C, Wils RP. A clinical retrospective evaluation of FA/HA coated (Biocomp) dental implants. Results after 1 year. Clin Oral Implants Res 1996;7:345–353.
48. de Wijs FL, Cune MS, van Rossen IP, de Putter C. Delayed implants in the anterior maxilla with the IMZ-implant system: A radiographical evaluation. J Oral Rehabil 1995;22:797–802.
240. Decock V, De Nayer K, De Boever JA, Dent M. 18-year longitudinal study of cantilevered fixed restorations. Int J Prosthodont 1996;9:331–340.

241. Dietz ER. The Maryland bridge as restoration alternative. Dent Assist (Waco TX) 1983;2:30–31, 38.
242. Dimashkieh MR, al-Shammery AR. Long-term survival of sleeve-designed fixed partial dentures: A clinical report. J Prosthet Dent 2000;84:591–593.
243. Drummond JL, Khalaf MA. Shear strength and filler particle characterization of Maryland (acid etch) bridge resin cements. Dent Mater 1989;5:209–212.
244. Dummer PM, Gidden J. The Maryland bridge: A useful modification. J Dent 1986;14:42–43.
245. Ellakwa AE, Shortall AC, Marquis PM. Influence of different techniques of laboratory construction on the fracture resistance of fiber-reinforced composite (FRC) bridges. J Contemp Dent Pract 2004;5:1–13.
246. el-Mowafy O, Rubo MH. Resin-bonded fixed partial dentures—A literature review with presentation of a novel approach. Int J Prosthodont 2000;13:460–467.
248. Favero GA, Carnesecchi L. The Maryland bridge: A conservative denture with a "low biological price" [in Italian]. G Stomatol Ortognatodonzia 1985;4:88–90.
249. Fayyad MA, al-Rafee MA. Failure of dental bridges: III—Effect of some technical factors. J Oral Rehabil 1996;23:675–678.
251. Fayyad MA, al-Rafee MA. Failure of dental bridges. IV. Effect of supporting periodontal ligament. J Oral Rehabil 1997;24:401–403.
252. Febbo A, Cozza P. Use of a Maryland bridge in a case of tooth agenesis. A bridge across the void [in Italian]. Attual Dent 1985;1:28–30.
253. Ferrari M, Cagidiaco MC. The Maryland bridge [in Italian]. Dent Cadmos 1984;52:39, 42–43, 46–47.
254. Flood AM. Resin bonded prostheses: Clinical guidelines. Aust Dent J 1989;34:209–218.
255. Freilich MA, Meiers JC, Duncan JP, Eckrote KA, Goldberg AJ. Clinical evaluation of fiber-reinforced fixed bridges. J Am Dent Assoc 2002;133:1524–1534.
256. Freilich MA, Niekrash CE, Katz RV, Simonsen RJ. The effects of resin-bonded and conventional fixed partial dentures on the periodontium: Restoration type evaluated. J Am Dent Assoc 1990;121:265–269.
257. Fuller CM, Vlahov D, Latkin CA, Ompad DC, Celentano DD, Strathdee SA. Social circumstances of initiation of injection drug use and early shooting gallery attendance: Implications for HIV intervention among adolescent and young adult injection drug users. J Acquir Immune Defic Syndr 2003;32:86–93.
258. Glantz PO, Nilner K. Patient age and long term survival of fixed prosthodontics. Gerodontology 1993;10:33–39.
259. Glantz PO, Nilner K, Jendresen MD, Sundberg H. Quality of fixed prosthodontics after 15 years. Acta Odontol Scand 1993;51:247–252.
261. Gohring TN, Roos M. Inlay-fixed partial dentures adhesively retained and reinforced by glass fibers: Clinical and scanning electron microscopy analysis after five years. Eur J Oral Sci 2005;113:60–69.
262. Gorlick R, Anderson P, Andrulis I, et al. Biology of childhood osteogenic sarcoma and potential targets for therapeutic development: Meeting summary. Clin Cancer Res 2003;9:5442–5453.
186. Gotfredsen K. A 5-year prospective study of single-tooth replacements supported by the Astra Tech implant: A pilot study. Clin Implant Dent Relat Res 2004;6:1–8.
264. Gragg KL, Shugars DA, Bader JD, Elter JR, White BA. Movement of teeth adjacent to posterior bounded edentulous spaces. J Dent Res 2001;80:2021–2024.
265. Greco S, Cicciu D. Use of the Maryland bridge in periodontology [in Italian]. Stomatol Mediterr 1989;9:43–48.
266. Guida L, Pensa G, Minervini G, Belardo S. "Maryland Bridge" technique and its possible use in periodontology [in Italian]. Arch Stomatol (Napoli) 1989;30:1267–1277.
267. Hall RM. Recruitment and retention: Getting back on track after above average minority students dropout. ABNF J 1997;8:11–13.
268. Hammerle CH. Success and failure of fixed bridgework. Periodontol 2000 1994;4:41–51.
269. Heged PC, Kalas A, Tar I. Application and survival rate of partial fixed dentures with combined retainers (adhesion wing, inlay, onlay, overlay, crown) [in Hungarian]. Fogorv Sz 1998;91:99–105.
270. Heinenberg BJ. If not, why not! Considerations on the Maryland bridge [in German]. Quintessenz 1984;35:2289–2290.
271. Heinenberg BJ, Maus H. Clinical preparation of the Maryland bridge [in German]. Quintessenz 1983;34:1157–1163.
272. Hickel R. Care of anterior diastemata in patients with lip-jaw-palate clefts [in German]. Fortschr Kieferorthop 1989;50:75–80.
273. Himmel R, Pilo R, Assif D, Aviv I. The cantilever fixed partial denture—A literature review. J Prosthet Dent 1992;67:484–487.
275. Hochman N, Yaffe A, Ehrlich J. Splinting: A retrospective 17-year follow-up study. J Prosthet Dent 1992;67:600–602.
276. Holley R. The Arizona bridge: An alternate arrangement to the Maryland-style bridge. Dent Today 1999;18:86–87.
277. Holm B. The Maryland Bridge—An alternative to conventional bridges [in Danish]. Tandlaegebladet 1986;90:669–676.
279. Holste T. Actual facial points as indication for bonded bridges [in German]. ZWR 1991;100:320, 323–324, 326–328.
280. Hornbrook DS. Placement protocol for an anterior fiber-reinforced composite restoration. Pract Periodontics Aesthet Dent 1997;9(5 suppl):1–5.
281. Ibaseta-Diaz G, Alvarez-Arenal A, Ellacuria-Echevarria J, Espinosa-Marino J, Maza Cano JL. Orthodontic and prosthodontic treatment in dental avulsion cases. Am J Dent 2002;15:346–348.
282. Jacobi R, Shillingburg HT Jr, Duncanson MG Jr. Effect of abutment mobility, site, and angle of impact on retention of fixed partial dentures. J Prosthet Dent 1985;54:178–183.
283. Jain P, Cobb D. Evaluation of a glass-fiber-reinforced, bonded, inlay-supported fixed partial denture—4-year results. Compend Contin Educ Dent 2002;23:779–783, 786.
284. Jemt T, Henry P, Linden B, Naert I, Weber H, Wendelhag I. Implant-supported laser-welded titanium and conventional cast frameworks in the partially edentulous jaw: A 5-year prospective multicenter study. Int J Prosthodont 2003;16:415–421.
285. Jepson N, Allen F, Moynihan P, Kelly P, Thomason M. Patient satisfaction following restoration of shortened mandibular dental arches in a randomized controlled trial. Int J Prosthodont 2003;16:409–414.
286. Johansson LA, Ekfeldt A. Implant-supported fixed partial prostheses: A retrospective study. Int J Prosthodont 2003;16:172–176.
287 Johnston C, Hussey DL. The immediate replacement of incisor teeth by cantilevered adhesive bridgework. Dent Update 1993;20:333–334.
288. Karlsson S. A clinical evaluation of fixed bridges, 10 years following insertion. J Oral Rehabil 1986;13:423–432.
290. Karlsson S, Hedegard B. Follow-up studies of patients with extensive bridge constructions. I: A study performed in 1982–83 to evaluate patients treated in 1974–75 in private dental practice [in Swedish]. Tandlakartidningen 1984;76:935–936, 941–946.

291. Karlsson U, Gotfredsen K, Olsson C. A 2-year report on maxillary and mandibular fixed partial dentures supported by Astra Tech dental implants. A comparison of 2 implants with different surface textures. Clin Oral Implants Res 1998;9:235–242.
292. Kaus T, Probster L, Weber H. Clinical follow-up study of ceramic veneered titanium restorations—Three-year results. Int J Prosthodont 1996;9:9–15.
294. Kern M, Glaser R. Cantilevered all-ceramic, resin-bonded fixed partial dentures: A new treatment modality. J Esthet Dent 1997;9:255–264.
295. Kern M, Strub JR. Resin bonding bridges—State of the art [in German]. Parodontol 1990;1:55–68.
297. Kerschbaum T, Paszyna C, Klapp S, Meyer G. Failure-time and risk analysis of fixed partial dentures [in German]. Dtsch Zahnarztl Z 1991;46:20–24.
298. Kerstein RB. Computerized occlusal management of a fixed/detachable implant prosthesis. Pract Periodontics Aesthet Dent 1999;11:1093–1102.
300. Kimmel K. The Maryland bridge [in German]. ZWR 1983;92:10–16.
301. Kindberg H, Gunne J, Kronstrom M. Tooth- and implant-supported prostheses: A retrospective clinical follow-up up to 8 years. Int J Prosthodont 2001;14:575–581.
302. Kirzioglu Z, Erturk MS. Success of reinforced fiber material space maintainers. J Dent Child (Chic) 2004;71:158–162.
303. Kline R, Hoar JE, Beck GH, Hazen R, Resnik RR, Crawford EA. A prospective multicenter clinical investigation of a bone quality-based dental implant system. Implant Dent 2002;11:224–234.
304. Knobloch L, Larsen PA, Rashid B, Carr AB. Six-month performance of implants with oxidized and machined surfaces restored at 2, 4, and 6 weeks postimplantation in adult beagle dogs. Int J Oral Maxillofac Implants 2004;19:350–356.
305. Kohen SG. Maryland bridge: Evaluation of the metal etching technic [in Spanish]. Rev Asoc Odontol Argent 1986;74:40, 44–45.
306. Koutayas SO, Kern M, Ferraresso F, Strub JR. Influence of design and mode of loading on the fracture strength of all-ceramic resin-bonded fixed partial dentures: An in vitro study in a dual-axis chewing simulator. J Prosthet Dent 2000;83:540–547.
307. Koutayas SO, Kern M, Ferraresso F, Strub JR. Influence of framework design on fracture strength of mandibular anterior all-ceramic resin-bonded fixed partial dentures. Int J Prosthodont 2002;15:223–229.
308. Krennmair G, Waldenberger O. Clinical analysis of wide-diameter Frialit-2 implants. Int J Oral Maxillofac Implants 2004;19:710–715.
309. Kutz FW, Wade TG, Pagac BB. A geospatial study of the potential of two exotic species of mosquitoes to impact the epidemiology of West Nile virus in Maryland. J Am Mosq Control Assoc 2003;19:190–198.
310. Lang NP, Pjetursson BE, Tan K, Bragger U, Egger M, Zwahlen M. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. II. Combined tooth-implant-supported FPDs. Clin Oral Implants Res 2004;15:643–653.
311. Laurell L, Lundgren D, Falk H, Hugoson A. Long-term prognosis of extensive polyunit cantilevered fixed partial dentures. J Prosthet Dent 1991;66:545–552.
313. Leempoel PJ, van 't Hof MA, de Haan AF. Survival studies of dental restorations: Criteria, methods and analyses. J Oral Rehabil 1989;16:387–394.
314. Lekholm U, Gunne J, Henry P, et al. Survival of the Brånemark implant in partially edentulous jaws: A 10-year prospective multicenter study. Int J Oral Maxillofac Implants 1999;14:639–645.
315. Lewinstein I, Ganor Y, Pilo R. Abutment positioning in a cantilevered shortened dental arch: A clinical report and static analysis. J Prosthet Dent 2003;89:227–231.
316. Li DW, Fradkin JF, Luks S, Tuchman B. Application of the Maryland bridge to a difficult case: A clinical report. N Y State Dent J 1988;54:23–24.
317. Li W, Swain MV, Li Q, Ironside J, Steven GP. Fibre reinforced composite dental bridge. Part I: Experimental investigation. Biomaterials 2004;25:4987–4993.
319. Lill W, Forster H, Eckhardt C, Matejka M, Watzek G. Conditions of the gingiva around endosteal implants with attached and unattached mucosa [in German]. Z Stomatol 1989;86:153–162.
320 Lindh T, Back T, Nystrom E, Gunne J. Implant versus tooth-implant supported prostheses in the posterior maxilla: A 2-year report. Clin Oral Implants Res 2001;12:441–449.
1. Lindh T, Gunne J, Tillberg A, Molin M. A meta-analysis of implants in partial edentulism. Clin Oral Implants Res 1998;9:80–90. [Already in list 3]
321. Lindquist E, Karlsson S. Success rate and failures for fixed partial dentures after 20 years of service: Part I. Int J Prosthodont 1998;11:133–138.
322. Livaditis GJ, Thompson VP. The Maryland bridge technique. TIC 1982;41:7–10.
323. Lum LB, Beirne OR, Curtis DA. Histologic evaluation of hydroxylapatite-coated versus uncoated titanium blade implants in delayed and immediately loaded applications. Int J Oral Maxillofac Implants 1991;6:456–462.
324. Lundershausen K. Retention-adhesion bridge (modified Maryland bridge) [in German]. Dtsch Zahnarztl Z 1984;39:408–412.
325. Lutzmann M. Maryland bridge, a valuable partial denture [in German]. Dent Labor (Munch) 1983;31:591–592.
326. Manhart J, Chen H, Hamm G, Hickel R. Buonocore Memorial Lecture. Review of the clinical survival of direct and indirect restorations in posterior teeth of the permanent dentition. Oper Dent 2004;29:481–508.
327. Marcucci M, Bandettini MV, Valenti G. Anchorage of the "Maryland bridge" to front teeth [in Italian]. Attual Dent 1988;4:34–40.
328. Marcus M, Reifel NM, Nakazono TT. Clinical measures and treatment needs. Adv Dent Res 1997;11:263–271.
329. Marotta JD. The half-fixed and half Maryland bridge. A solution to a difficult situation. Oral Health 1986;76:31–32.
330. Mazurat RD. Longevity of partial, complete and fixed prostheses: A literature review. J Can Dent Assoc 1992;58:500–504.
332. Meyer G, Blandow HP. Maryland bridge in correct use [in German]. Zahntechnik (Zur) 1985;43:302–306.
331. Meyer G, Blandow HP. Maryland bridge as a practical alternative [in German]. Dent Labor (Munch) 1985;33:987–988.
333. Miller SM, Bowen DJ, Campbell MK, et al. Current research promises and challenges in behavioral oncology: Report from the American Society of Preventive Oncology annual meeting, 2002. Cancer Epidemiol Biomarkers Prev 2004;13:171–180.
334. Miller TE. Reverse Maryland bridges: Clinical applications. J Esthet Dent 1989;1:155–163.
335. Miranda ME. Fixed dentures with composite resin and electrolytic acid etching. The Maryland Bridge [in Portuguese]. RGO 1983;31:356–360.
336. Mito RS, Caputo AA, James DF. Load transfer to abutment teeth by two non-metal adhesive bridges. Pract Periodontics Aesthet Dent 1991;3:31–37.

337. Monya Y, Matsumura H, Atsuta M. A two-stage resin-bonded fixed partial denture seated in conjunction with postextraction healing of the alveolar socket: A clinical report. J Prosthet Dent 1998;80:4–8.
338. Moschen I, Kulmer S, Schaffer H. The Pontic. Preventive consideration of pontic design [in German]. Parodontol 1991;2:7–23.
339. Muche R, Krausse A, Strub JR. Success rates of implant supported prostheses in partially edentulous patients—Part II [in German]. Schweiz Monatsschr Zahnmed 2003;113:404–410.
117. Naert I, Koutsikakis G, Duyck J, Quirynen M, Jacobs R, van Steenberghe D. Biologic outcome of implant-supported restorations in the treatment of partial edentulism. Part I: A longitudinal clinical evaluation. Clin Oral Implants Res 2002;13:381–389.
341. Naert IE, Duyck JA, Hosny MM, van Steenberghe D. Freestanding and tooth-implant connected prostheses in the treatment of partially edentulous patients. Part I: An up to 15-years clinical evaluation. Clin Oral Implants Res 2001;12:237–244.
342. Nagasiri R, Chitmongkolsuk S. Long-term survival of endodontically treated molars without crown coverage: A retrospective cohort study. J Prosthet Dent 2005;93:164–170.
9. Newcombe RG. Two-sided confidence intervals for the single proportion: Comparison of seven methods. Stat Med 1998;17:857–872.
344. Novak A, Sedej R. The Maryland bridge and its strength [in Croatian]. Zobozdrav Vestn 1984;39:87–97.
345. O'Campo P, Gielen AC, Faden RR, Xue X, Kass N, Wang MC. Violence by male partners against women during the childbearing year: A contextual analysis. Am J Public Health 1995;85:1092–1097.
346. Ohlendorf KD. Modification of a Maryland bridge [in German]. Quintessenz Zahntech 1991;17:173–176.
347. Olson JW, Dent CD, Morris HF, Ochi S. Long-term assessment (5 to 71 months) of endosseous dental implants placed in the augmented maxillary sinus. Ann Periodontol 2000;5:152–156.
348. Olsson KG, Furst B, Andersson B, Carlsson GE. A long-term retrospective and clinical follow-up study of In-Ceram Alumina FPDs. Int J Prosthodont 2003;16:150–156.
349. Owall B. Precision attachment retained removable partial dentures: 1. Technical long-term study. Int J Prosthodont 1991;4:249–257.
350. Ozcan M, Niedermeier W. Clinical study on the reasons for and location of failures of metal-ceramic restorations and survival of repairs. Int J Prosthodont 2002;15:299–302.
351. Paduano S, Laino A, Michelotti A, Viglione G. Use of the Maryland bridge for space maintenance: Discussion of a clinical case [in Italian]. Arch Stomatol (Napoli) 1988;29:1317–1326.
352. Palazzoli G. Economical and practical aspects of the Maryland bridge [in Italian]. Riv Ital Odontotec 1984;20:28–31.
353. Palazzoli G. A clinical case resolved by the use of a variation of the Maryland bridge technic [in Italian]. Dent Cadmos 1985;53:79–80.
354. Palmqvist S, Soderfeldt B. Multivariate analyses of factors influencing the longevity of fixed partial dentures, retainers, and abutments. J Prosthet Dent 1994;71:245–250.
356. Pang SE. A report of anterior In-Ceram restorations. Ann Acad Med Singapore 1995;24:33–37.
132. Parein AM, Eckert SE, Wollan PC, Keller EE. Implant reconstruction in the posterior mandible: A long-term retrospective study. J Prosthet Dent 1997;78:34–42.
357. Paterson N. The longevity of restorations. A study of 200 regular attenders in a general dental practice. Br Dent J 1984;157:23–25.
358. Pellecchia M, Pellecchia R, Emtiaz S. Distal extension mandibular removable partial denture connected to an anterior fixed implant-supported prosthesis: A clinical report. J Prosthet Dent 2000;83:607–612.
359. Petrikas AO, Kliuev BS. A method for preparing the abutment teeth for resin-bonded bridge dentures and resin-bonded facings (veneers) and its anatomical validation [in Russian]. Stomatologiia (Mosk) 1997;76:46–50.
360. Petrovsky ME. A technique for the replacement of multiple missing anterior teeth in the presence of a mutilated alveolar ridge. J Tenn Dent Assoc 1991;71:33–35.
5. Tan K, Pjetursson BE, Lang NP, Chan ES. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. Clin Oral Implants Res 2004;15:654–666.
362. Plainfield S, Wood V, Podesta R. A stress-relieved resin-bonded fixed partial denture. J Prosthet Dent 1989;61:291–293.
363. Pospiech P, Rammelsberg P, Goldhofer G, Gernet W. All-ceramic resin-bonded bridges. A 3-dimensional finite-element analysis study. Eur J Oral Sci 1996;104(4(Pt 1)):390–395.
364. Poyser NJ, Briggs PF, Chana HS. A modern day application of the Rochette bridge. Eur J Prosthodont Restor Dent 2004;12:57–62.
365. Preston JD. Preventing ceramic failures when integrating fixed and removable prostheses. Dent Clin North Am 1979;23:37–52.
367. Priest GF. Failure rates of restorations for single-tooth replacement. Int J Prosthodont 1996;9:38–45.
369. Probster L. Survival rate of In-Ceram restorations. Int J Prosthodont 1993;6:259–263.
370. Prosper L, Gherlone EF, Redaelli S, Quaranta M. Four-year follow-up of larger-diameter implants placed in fresh extraction sockets using a resorbable membrane or a resorbable alloplastic material. Int J Oral Maxillofac Implants 2003;18:856–864.
371. Quinn F, Gratton DR, McConnell RJ. The performance of conventional, fixed bridgework, retained by partial coverage crowns. J Ir Dent Assoc 1995;41:6–9.
372. Raghoebar GM, Friberg B, Grunert I, Hobkirk JA, Tepper G, Wendelhag I. 3-year prospective multicenter study on one-stage implant surgery and early loading in the edentulous mandible. Clin Implant Dent Relat Res 2003;5:39–46.
373. Raigrodski AJ. Clinical and laboratory considerations for the use of CAD/CAM Y-TZP-based restorations. Pract Proced Aesthet Dent 2003;15:469–476.
374. Raigrodski AJ. Contemporary all-ceramic fixed partial dentures: A review. Dent Clin North Am 2004;48:viii, 531–544.
376. Randow K, Derand T. On functional strain in fixed and removable partial dentures. An experimental in vivo study. Acta Odontol Scand 1993;51:333–338.
379. Reinlib L, Abraham W. Recovery from heart failure with circulatory assist: A working group of the National, Heart, Lung, and Blood Institute. J Card Fail 2003;9:459–463.
381. Riley ED, Safaeian M, Strathdee SA, Brooner RK, Beilenson P, Vlahov D. Drug user treatment referrals and entry among participants of a needle exchange program. Subst Use Misuse 2002;37:1869–1886.
383. Rokni SR. Combination acid-etched and coping-superstructure fixed partial prosthesis. Quintessence Int 1996;27:189–192.
384. Romagnoli M. Microcrystals for the Maryland bridge [in Italian]. Attual Dent 1986;2:35–37, 39, 41.
385. Samama Y. Fixed bonded prosthodontics: A 10-year follow-up report. Part I: Analytical overview. Int J Periodontics Restorative Dent 1995;15:424–435.

387. Sardelis MR, Turell MJ, O'Guinn ML, Andre RG, Roberts DR. Vector competence of three North American strains of Aedes albopictus for West Nile virus. J Am Mosq Control Assoc 2002;18:284–289.
388. Schmitt SM, Brown FH. Management of root-amputated maxillary molar teeth: Periodontal and prosthetic considerations. J Prosthet Dent 1989;61:648–652.
4. Scurria MS, Bader JD, Shugars DA. Meta-analysis of fixed partial denture survival: Prostheses and abutments. J Prosthet Dent 1998;79:459–464.
389. Selby A. Fixed prosthodontic failure. A review and discussion of important aspects. Aust Dent J 1994;39:150–156.
391. Sewon LA, Ampula L, Vallittu PK. Rehabilitation of a periodontal patient with rapidly progressing marginal alveolar bone loss: 1-year follow-up. J Clin Periodontol 2000;27:615–619.
392. Sharma P. 90% of fixed partial dentures survive 5 years. How long do conventional fixed partial dentures (FPDs) survive and how frequently do complications occur? Evid Based Dent 2005;6:74–75.
393. Shugars DA, Bader JD, Phillips SW Jr, White BA, Brantley CF. The consequences of not replacing a missing posterior tooth. J Am Dent Assoc 2000;131:1317–1323.
395. Siervo S, Pampalone A, Siervo P, Cerri E, Bandettini B, Siervo R. Rescue of a "hopeless" second premolar. Oral Surg Oral Med Oral Pathol 1993;76:276–278.
396. Snyder EP, Subtelny JD. An American Board of Orthodontics case report. Orthodontic treatment of a patient born with a severe right unilateral cleft lip and palate. Am J Orthod Dentofacial Orthop 1989;95:273–281.
398. Sognnaes RF. Preface to professional progress from Washington's old ivory relics to the modern Maryland bridge. J Md State Dent Assoc 1983;26:79–86.
399. Solimei GE, Barucchi AM, Gaviano E, Montagna E. The Maryland bridge: Acid etched bonded dentures. Cementation [in Italian]. Parodontol Stomatol (Nuova) 1985;24:109–114.
400. Sorensen JA, Kang SK, Torres TJ, Knode H. In-Ceram fixed partial dentures: Three-year clinical trial results. J Calif Dent Assoc 1998;26:207–214.
401. Sorley DL, Levin ML, Warren JW, Flynn JP, Gersenblith. Bat-associated histoplasmosis in Maryland bridge workers. Am J Med 1979;67:623–626.
402. Stein JM. Functional prosthetic treatment for the partially edentulous with osseointegrated implants [in French]. Cah Prothese 1990;(72):102–110.
403. Stockton LW. Cantilever fixed partial denture—A literature review. J Can Dent Assoc 1997;63:118–121.
404. Strathdee SA, Celentano DD, Shah N, et al. Needle-exchange attendance and health care utilization promote entry into detoxification. J Urban Health 1999;76:448–460.
405. Studer SP, Mader C, Stahel W, Scharer P. A retrospective study of combined fixed-removable reconstructions with their analysis of failures. J Oral Rehabil 1998;25:513–526.
406. Styner D, Poulos J, Chimerine R, Luster JE, Ferrara M. Immediate provisional and long-term anterior prosthodontics: A comprehensive approach. Compend Contin Educ Dent 1996;17:560–562.
164. Sullivan DY, Sherwood RL, Porter SS. Long-term performance of Osseotite implants: A 6-year clinical follow-up. Compend Contin Educ Dent 2001;22:326–328, 330, 332–334.
408. Suttor D. Lava zirconia crowns and bridges. Int J Comput Dent 2004;7:67–76.
5. Tan K, Pjetursson BE, Lang NP, Chan ES. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years. Clin Oral Implants Res 2004;15:654–666.
409. Tangerud T, Gronningsaeter AG, Taylor A. Fixed partial dentures supported by natural teeth and Brånemark system implants: A 3-year report. Int J Oral Maxillofac Implants 2002;17:212–219.
410. Thompson VP. The Maryland bridge [in German]. Phillip J Restaur Zahnmed 1985;2:23–26.
411. Tinschert J, Natt G, Mautsch W, Spiekermann H, Anusavice KJ. Marginal fit of alumina- and zirconia-based fixed partial dentures produced by a CAD/CAM system. Oper Dent 2001;26:367–374.
412. Tinsley D, Watson CJ, Russell JL. A comparison of hydroxylapatite coated implant retained fixed and removable mandibular prostheses over 4 to 6 years. Clin Oral Implants Res 2001;12:159–166.
413. Trentalancia M, Gallini G, Pasqualini M. Maryland bridge: Presentation of 2 bonded complete upper fixed dentures [in Italian]. Dent Cadmos 1986;54:47–48, 51–56.
414. Trushkowsky R. Fiber-reinforced composite bridge and splint. Replacing congenitally missing teeth. N Y State Dent J 2004;70:34–38.
415. Trushkowsky RD. Replacement of congenitally missing lateral incisors with ceramic resin-bonded fixed partial dentures. J Prosthet Dent 1995;73:12–16.
417. Valderhaug J, Jokstad A, Ambjornsen E, Norheim PW. Assessment of the periapical and clinical status of crowned teeth over 25 years. J Dent 1997;25:97–105.
418. Vallittu PK. Survival rates of resin-bonded, glass fiber-reinforced composite fixed partial dentures with a mean follow-up of 42 months: A pilot study. J Prosthet Dent 2004;91:241–246.
419. Vallittu PK, Sevelius C. Resin-bonded, glass fiber-reinforced composite fixed partial dentures: A clinical study. J Prosthet Dent 2000;84:413–418.
420. van Dalen A, Feilzer AJ. Cantilever resin-bonded bridges with one adhesive surface. A review of the literature [in Dutch]. Ned Tijdschr Tandheelkd 2003;110:143–148.
421. van Dalen A, Feilzer AJ, Kleverlaan CJ. A literature review of two-unit cantilevered FPDs. Int J Prosthodont 2004;17:281–284.
422. Van Nieuwenhuysen JP, D'Hoore W, Carvalho J, Qvist V. Long-term evaluation of extensive restorations in permanent teeth. J Dent 2003;31:395–405.
424. Verzijden CW, Creugers NH, van 't Hof MA. Treatment times for posterior resin-bonded bridges. Community Dent Oral Epidemiol 1990;18:304–308.
425. Verzijden CW, Creugers NH, van 't Hof MA. A meta-analysis of two different trials on posterior resin-bonded bridges. J Dent 1994;22:29–32.
426. Vitsentzos SI. A new device to directly examine parallelism of abutment teeth. J Prosthet Dent 1989;61:531–534.
427. Walker RS. Pin stabilization of a partially uncemented Maryland bridge. Gen Dent 1988;36:139–140.
428. Walter M, Boning K, Reppel PD. Clinical performance of machined titanium restorations. J Dent 1994;22:346–348.
430. Walton JN, Gardner FM, Agar JR. A survey of crown and fixed partial denture failures: Length of service and reasons for replacement. J Prosthet Dent 1986;56:416–421.
431. Walton TR. A ten-year longitudinal study of fixed prosthodontics: 1. Protocol and patient profile. Int J Prosthodont 1997;10:325–331.
432. Walton TR. A 10-year longitudinal study of fixed prosthodontics: Clinical characteristics and outcome of single-unit metal-ceramic crowns. Int J Prosthodont 1999;12:519–526.
433. Walton TR. An up to 15-year longitudinal study of 515 metal-ceramic FPDs: Part 1. Outcome. Int J Prosthodont 2002;15:439–445.

435. Wang CH, Tsai CC, Chen TY, Chang GL. Photoelastic stress analysis of mandibular posterior cantilevered pontic. J Oral Rehabil 1996;23:662–666.
436. Watanabe F, Powers JM, Lorey RE. In vitro bonding of prosthodontic adhesives to dental alloys. J Dent Res 1988;67:479–483.
437. Wenz HJ, Lehmann KM. A telescopic crown concept for the restoration of the partially edentulous arch: The Marburg double crown system. Int J Prosthodont 1998;11:541–550.
438. Wilkes PW, Shillingburg HT Jr, Johnson DL. Effects of resistance form on attachment strength of resin-retained castings. J Okla Dent Assoc 2000;90:16–20, 22, 24–25.
439. Williams VD, Drennon DG, Silverstone LM. The effect of retainer design on the retention of filled resin in acid-etched fixed partial dentures. J Prosthet Dent 1982;48:417–423.
440. Wood M, Thompson VP. Resin-bonded prosthodontics. An update. Dent Clin North Am 1993;37:445–455.
441. Wood M, Thompson VP, Romberg E, Morrison GV. Resin-bonded fixed partial dentures. I. Proposed standardized criteria for evaluation. J Prosthet Dent 1996;76:363–367.
442. Wright WE. Success with the cantilever fixed partial denture. J Prosthet Dent 1986;55:537–539.
443. Yang HS, Chung HJ, Park YJ. Stress analysis of a cantilevered fixed partial denture with normal and reduced bone support. J Prosthet Dent 1996;76:424–430.
444. Yang JH. A clinical study on the distribution and the bond failure of etched Maryland bridge (I). A preliminary report of 135 cases [in Korean]. Taehan Chikkwa Uisa Hyophoe Chi 1987;25:578–587.
445. Yap AU, Stokes AN. Resin-bonded prostheses. Quintessence Int 1995;26:521–530.
447. Zimmer D, Gerds T, Strub JR. Survival rate of IPS-Empress 2 all-ceramic crowns and bridges: Three years' results [in German]. Schweiz Monatsschr Zahnmed 2004;114:115–119.