THE JOURNAL OF PROSTHETIC DENTISTRY

CLINICAL SCIENCE

Performance of zirconia ceramic cantilever fixed dental prostheses: 3-Year results from a prospective, randomized, controlled pilot study

Andreas Zenthöfer, DMD,[a] Brigitte Ohlmann, DMD, PhD,[b] Peter Rammelsberg, DMD, PhD,[c] and Wolfgang Bömicke, DMD, MSc[d]

ABSTRACT

Statement of problem. Little is known about the clinical performance of ceramic cantilever fixed dental prostheses on natural teeth.

Purpose. The purpose of this randomized controlled pilot study was to evaluate the clinical performance of ceramic and metal ceramic cantilever fixed dental prostheses (CFDPs) after 3 years of service.

Material and methods. Twenty-one participants were randomly allocated to 2 treatment groups. Participants in the ceramic (ZC) group (n=11) each received 1 CFDP made of yttria-stabilized, tetragonal zirconia polycrystal; the others (n=10) were fitted with a metal ceramic (MC) CFDP. All CFDPs were retained by 2 complete crown abutments and replaced 1 tooth. The clinical target variables were survival, incidence of complications, probing pocket depth (PPD), probing attachment level (PAL), plaque index (PI), gingival index (GI), and esthetic performance as rated by the participants. The United States Public Health Service (USPHS) criteria were used to evaluate chipping, retention, color, marginal integrity, and secondary caries. Descriptive statistics and nonparametric analyses were applied to the target variables in the 2 groups. The esthetic performance of the CFDPs was also visualized by using a pyramid comparison.

Results. The overall survival of the CFDPs was 100% in both groups. During the 3-year study, 6 clinically relevant complications requiring aftercare were observed among 5 participants (4 in the ZC group and 2 in the MC group). Changes in the PI, GI, PPD, and PAL of the abutment teeth were similar for both groups ($P>.05$). The participants regarded the esthetic performance of ZC-CFDPs and MC-CFDPs as satisfactory.

Conclusions. Within the 3-year observation period, the clinical performance of MC-FDPs and ZC-FDPs was acceptable. More extensive research with larger sample sizes is encouraged, however, to confirm the evaluation of the survival of Y-TZP hand-veneered cantilever FPDs. (J Prosthet Dent 2015;114:34-39)

Single crowns (SCs) or fixed dental prostheses (FDPs) supported by implants, removable dental prostheses (RDPs), or cantilever FDPs (CFDPs) are considered appropriate replacements for missing posterior teeth.

If dental implants are contraindicated for anatomic, medical, psychological, or financial reasons, the use of CFDPs helps avoid RDPs, which are frequently inferior to FDPs.[1,2] Sometimes CFDPs might also be favored over end-abutment FDPs, primarily if 2 neighboring teeth adjacent to an edentulous space show defects or have been extensively restored, and the teeth, which would serve as the second abutment, are sound.[3] Evidence is limited and somewhat controversial as to the risk of failure of CFDPs compared with conventional end-abutment restorations. Some authors have reported lower survival and a greater incidence of complications,[4] whereas others have demonstrated comparable performance.[5,6] Nevertheless, the literature indicates that metal ceramic (MC) CFDPs are a well-established and efficient prosthetic treatment for the posterior edentulous ridge,[7] most notably if a single

[a]Assistant Professor, Department of Prosthodontics, University Hospital Heidelberg, University of Heidelberg, Heidelberg, Germany.
[b]Associate Professor, Department of Prosthodontics, University Hospital Heidelberg, University of Heidelberg, Heidelberg, Germany.
[c]Director, Department of Prosthodontics, University Hospital Heidelberg, University of Heidelberg, Heidelberg, Germany.
[d]Assistant Professor, Department of Prosthodontics, University Hospital Heidelberg, University of Heidelberg, Heidelberg, Germany.

Clinical Implications

Zirconia ceramic cantilever fixed dental prostheses may be an acceptable alternative to metal ceramic cantilever fixed dental prostheses to replace 1 missing tooth whenever implant placement is not applicable.

cantilever extension is retained by at least 2 complete crown abutments.[8,9]

Patients demand natural looking restorations. In this context, MC-FDPs are esthetically limited by low translucency and the poor appearance of the restoration margin.[10] These esthetic limitations can be overcome with yttria-stabilized, tetragonal zirconia polycrystal (Y-TZP).[11,12] A laboratory investigation concluded that zirconia ceramic (ZC) CFPDs might be contraindicated in the posterior region because of unsatisfactory fracture resistance, although this study simulated extremely unlikely conditions.[13] However, Y-TZP frameworks in clinical service have superior strength and fracture resistance, and core fractures are rare.[14-16] Nevertheless, such concerns as material aging and veneer chipping should also be kept in mind.[17-19] Reported evidence on ZC-CFDPs is sparse, however. A clinical study that investigated ZC-CFDPs yielded promising results; the incidence of complications was not significantly different for end-abutment and cantilever zirconia FDPs.[20] Although randomized trials in which ZC-CFDPs are compared with the recommended standard (metal ceramic) are rare, a recent study of both groups revealed that clinical outcomes, namely survival, incidence of complications, and periodontal data, were comparable after 2 years in service.[21]

The present study was exploratory in nature and did not aim to confirm clinically effect sizes but rather to describe the performance of ceramic CFDPs with Y-TZP frameworks and MC-CFDPs after 3 years in clinical service in a small cohort of 11 and 10 participants. This information could be used to plan future confirmatory trials.

MATERIAL AND METHODS

This randomized controlled pilot study was approved by the local review board of the University of Heidelberg (MV-452/2005). Participants referred to the Department of Prosthodontics of the University of Heidelberg for the rehabilitation of a single missing posterior or anterior tooth (except canine) were selected for this study. All participants received oral and written information. The inclusion criteria were a signed consent form and an age of 18 years or above. Participants with nonvital abutment teeth, self-reported grinding or clenching, documented allergic reactions to the materials used, or inadequate oral hygiene were excluded from the study. Twenty-one participants met the inclusion criteria (57.1% women). The mean age of the participants was 56 years (SD, 12.6; range, 26 to 74). Twenty-one cantilever FDPs were placed in the participants (1 restoration each). All participants were allocated randomly to 2 treatment groups by drawing lots. Eleven participants received a ZC-CFDP and 10 participants were provided with an MC-CFDP (Fig. 1).

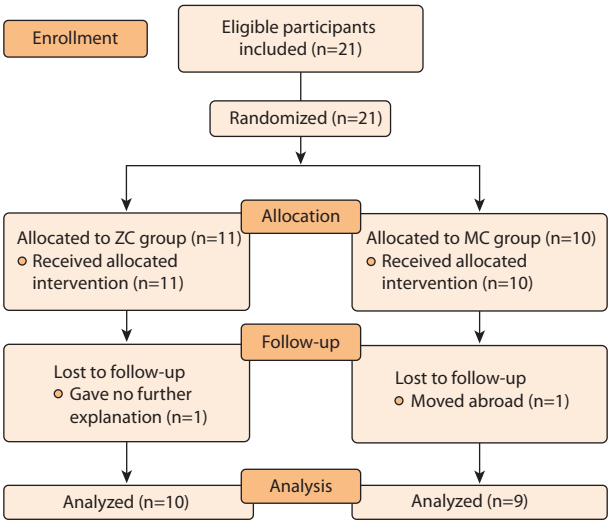

Figure 1. Participants' flowchart at 3-year follow-up.

The preparation of the abutment teeth was the same as for complete crowns, following a standardized procedure. All deficient restoration material was removed and carious lesions were excavated. If necessary, the abutment teeth were restored with an adhesive foundation (Tetric Bleach; Ivoclar Vivadent GmbH) to enable an adequate preparation design. During the preparation of the abutment teeth, the anatomic form was respected, with a minimum occlusal reduction of 1.5 mm and axial reduction of 1.2 mm (chamfer finish line). The planned convergence angle was 3 degrees. After abutment preparation, polyether impressions (Impregum; 3M ESPE) were made and poured with Type IV gypsum (Fujirock Golden Brown; GC Europe) after a minimum time of 15 minutes. An impression of the opposing dentition was cast and mounted in an articulator. ZC-CFDPs were fabricated with Y-TZP frameworks (Lava; 3M ESPE) with computer-aided design and computer-aided manufacturing (CAD/CAM) technology. First, the frameworks were scanned (Lava Scan; 3M ESPE). The framework design followed the anatomic form[22] and retained a minimum wall thickness of 0.6 mm for the anterior and 0.7 mm for the posterior restorations. The connector dimensions were at least 8 mm^2 for the anterior and 12 mm^2 for the posterior frameworks. The frameworks were milled (Lava Form; 3M ESPE), sintered at 1500°C (Lava Therm; 3M ESPE), and veneered with

Table 1. Characteristics of participants (n=19)

Characteristic	ZC Group	MC Group	Total Cohort
Mean age (y)	55.6 (SD, 11.9)	58.8 (SD, 14.4)	57.1 (SD, 12.9)
Sex, n (%)			
Women	3 (15.8)	5 (26.3)	8 (42.1)
Men	7 (36.8)	4 (21.1)	11 (57.9)
Location of FDPs, n (%)			
Maxilla	5 (26.3)	7 (36.8)	12 (63.2)
Mandible	5 (26.3)	2 (10.5)	7 (36.8)
Region of FDPs, n (%)			
Anterior	5 (26.3)	0 (0.0)	5 (26.3)
Posterior	5 (26.3)	9 (47.4)	14 (73.7)

Table 2. Incidence of complications during 3-year observation period

No.	Type of Restoration	Type of Complication	Location	Region	Time to Complication (mo)
1	ZC-CFDP	Endodontic treatment	Mandible	Posterior	8
2	ZC-CFDP	Minor chipping	Maxilla	Anterior	12
3	ZC-CFDP	Minor chipping	Mandible	Posterior	13
4	ZC-CFDP	Endodontic treatment	Maxilla	Anterior	23
5	MC-CFDP	Endodontic treatment	Maxilla	Posterior	25
6	MC-CFDP	Minor chipping	Mandible	Posterior	35

ceramic (Lava Ceram; 3M ESPE). To fabricate the MC-CFDPs, the frameworks were cast from a high-gold alloy (DeguDent U; DeguDent GmbH) and veneered (VITA VM 13; Vita Zahnfabrik H. Rauter GmbH & Co KG). As with the fabrication of the ZC-CFDPs, the metal frameworks and ceramic veneer followed the anatomic form.

All restorations were assessed while fitted in participants. If required, adjustments were made and repolished with ceramic-specific rotary instruments. All restorations were cemented with a self-adhesive resin cement (Rely X Unicem; 3M ESPE). All materials were used in accordance with the manufacturers' instructions. After cementation, the participants were instructed in oral hygiene.

Recall appointments were scheduled after 2 weeks for baseline evaluation and then for follow-up evaluation at 6 months and 1, 2, and 3 years after insertion. These examinations were conducted by a dentist who was not involved in the treatment process. At all recall appointments, the restorations were evaluated for complications and failures. The United States Public Health criteria (USPHS)[23] were used to evaluate chipping, retention, color, marginal integrity, and secondary caries. Clinical condition was rated alpha, beta, charlie, or delta, where charlie and delta imply a need for replacement of the restoration. The examination also included testing of tooth vitality and mobility. Probing pocket depth (PPD), probing attachment level (PAL), defined as the distance between the restoration margin and the bottom of the gingival sulcus, plaque index (PI),[24] and gingival index (GI)[25] were also assessed for both abutment and natural reference teeth measured at 6 sites per tooth. For PI and GI the site with the highest score per tooth was recorded. To assess the esthetic performance of the FDPs, the participants were asked to express their level of satisfaction with the restorations on a 6-point scale ranging from "fully satisfied" (0) to "very unhappy, want to change clinical situation" (5).

Statistical analysis was performed with software (SPSS v19.0; IBM Corp). Participants' characteristics were described by mean values, standard deviations, or frequencies, where appropriate. Time and type of complications were listed individually. The small sample size of the study and the discrete scale of the investigated target variables PPD, PAL, PI, and GI motivated the use of nonparametric statistics (median, quartiles, and Mann-Whitney U test). The level of statistical significance was set to α=.05. Calculated *P* values should be interpreted as exploratory. In addition, the distribution of the esthetic ratings of CFDPs was visualized by using a pyramid comparison and compared between the groups with a chi-square test. A sample size calculation was performed to determine how many participants per group would be needed to detect a statistically significant difference at α=.05 for the incidence of material fractures if a power of 80% was intended.

RESULTS

Two participants were lost to 3-year follow-up with their intact restorations in situ (Fig. 1). One provided no explanation; the other had moved abroad. Both were regarded as dropouts. Complete target data were therefore available for 19 FDPs, 10 in the ZC and 9 in the MC group (response: 90.5%). The distribution of the FDPs is presented in Table 1. Overall, survival was 100% in both groups. During the 3-year study period, 6 clinically relevant complications were observed for 5 participants. In the ZC group, 2 biological problems and 2 technical problems occurred; in the MC group, 1 biological problem and 1 technical problem were observed (Table 2). The biological complications were all endodontic in nature and were successfully overcome by means of endodontic treatment and direct composite resin restorations. In this context, no further loss of vitality was observed after 3 years. All other abutment teeth remained vital. The technical complications (chipping) were resolved by polishing. The 3 instances of chipping were classified as beta (minor chipping) by using the USPHS criteria. The marginal integrity of 1 restoration in the test group was also regarded as beta. All other restorations were alpha. No framework fracture, retention loss, discoloration, or secondary caries occurred. As a global observation, PI and

Table 3. Median (25%/75% quartiles) changes of plaque index and gingival index in study groups (n=19) with 95% confidence intervals after 3 years compared with baseline

Index	ZC Group	MC Group	*P*
Plaque index			
Abutment teeth	1 (0/1.3)	0 (0/1)	.095
Reference teeth	1 (0/1)	0 (-0.3/1)	.400
Gingiva index			
Abutment teeth	1 (0/1.3)	1 (-0.5/1)	.243
Reference teeth	1 (0/1)	1 (-0.5/1)	.356

Table 4. Median (25%/75% quartiles) changes of PPD and PAL in study groups (n=19) after 3 years compared with baseline

Measurement	ZC Group	MC Group	*P*
Periodontal pocket depth (PPD)			
Abutment teeth (proximal)	0.5 (0.5/1.0)	0.5 (-0.2/0.8)	.315
Abutment teeth (distal)	0.7 (0.3/0.8)	0.3 (0.1/0.5)	.113
Reference teeth (proximal)	0.5 (0.2/0.6)	0.2 (-0.1/0.6)	.400
Reference teeth (distal)	0.7 (0.5/0.9)	0.3 (0/0.5)	.011
Probing attachment level (PAL)			
Abutment teeth (proximal)	0.7 (0.5/1.0)	0.5 (0.2/0.8)	.400
Abutment teeth (distal)	0.7 (0.3/1.0)	0.2 (0.1/0.3)	.079
Reference teeth (proximal)	0.4 (-0.2/0.9)	0.2 (-0.2/0.7)	.780
Reference teeth (distal)	0.7 (0.2/0.9)	0.3 (-0.1/0.6)	.190

GI values after 3 years were slightly higher for both groups than at baseline. When PI and GI changes of reference teeth were monitored, the findings were similar for both abutment teeth and reference teeth in the 2 study groups ($P>.05$), indicating that deterioration of oral hygiene was not group-specific but rather intraindividual (Table 3). The same was true for PPD and for PAL. Changes in these indices were comparable in the 2 test groups for both the abutment and reference teeth ($P>.05$) with the exception of the PPD of the distal reference tooth ($P<.011$) (Table 4). The participants' rating of esthetics was in median 0 (25% quartile, 0; 75% quartile, 1) in the ZC group and 0 (25% quartile, 0; 75% quartile, 1.5) in the MC group, reflecting high satisfaction with the esthetic outcome for ZC-CFDPs and MC-CFDPs. In the ZC group 100% and in the MC group 78% of the participants were "satisfied" to "fully satisfied." Differences in distributions of the participants' ratings between the 2 groups did not reach the level of statistical significance ($P=.288$). Detailed esthetic ratings are shown in Figure 2.

The post hoc power calculation revealed that 253 participants per group would be needed to confirm a difference in the incidence of material fractures (complication rates: 2/10 in the ZC group, 1/9 in the MC group; $\alpha=.05$; power=80%) after 3 years in service.

DISCUSSION

In this randomized, controlled pilot study, the performance of hand-veneered Y-TZP and metal ceramic cantilever FDPs was evaluated after 3 years in clinical service. Ideally, restorations used to rehabilitate dentition should meet at least the criteria of low incidence of failure and acceptable long-term esthetics. Because complications contribute primarily to cost and time-consuming aftercare, esthetics correlates with participants' satisfaction. Although this study should not be regarded as confirmatory, a comparable performance of zirconia ceramic and metal ceramic cantilever FDPs has been observed. A previous laboratory investigation of the fracture resistance of ZC-CFPDs provided disappointing results, however. Depending on the framework design, fracture loads were approximately between 350 and 550 N, suggesting that ZC-CFDPs should not be recommended for the clinical replacement of a missing posterior tooth.[13] These results should, however, be considered in perspective; these forces were measured under adverse test conditions, for example, isolated loading on the distal aspect of the cantilever extensions, which is clinically unlikely. Also zirconia framework fractures in clinical settings are relatively uncommon.[14,15] Other authors have obtained promising clinical results for ceramic cantilever systems, in agreement with the results obtained in this study.[20,21] In general, the literature indicates that chipping of the veneer is of major concern for FPDs made with zirconia frameworks.[17,19]

Many conditions might affect the risk of chipping, however. Although framework design,[22] firing procedure,[18] antagonistic occlusion, surface damage, and material aging are suspected of affecting the risk of veneer fracture,[17,19] chipping risk may not be higher for veneered zirconia FDPs than for metal ceramic ones.[15,16]

This study consistently recorded a similar outcome among the groups with regard to chipping, which was observed for both ZC-FDPs and MC-CFDPs. Biological complications are also important aspects of clinical success, however. In this study, 3 endodontic problems were encountered, irrespective of the restoration material used. This can be explained by the preparation protocol, which was similar for both restorations and did not require an increased removal of tooth substance for ZC-CFDPs. Furthermore, oral hygiene and periodontal conditions are also relevant to long-term clinical success. In agreement with the results of Sailer et al[16] and Pelaez et al,[15] comparable changes of GI, PI, PPD, and PAL were observed among the groups. Interestingly, the esthetic rating of participants fitted with ZC-CFDPs and MC-CFDPs was also comparable. Because ceramic restorations look natural and because of excellent translucency and color adaptation,[11] larger differences might have been expected. However, the esthetics of metal ceramic systems has recently been improved. The ceramic veneer of MC-FDPs and ZC-FDPs can also become lighter over time,[12] and, in the long term, gingival recession might expose the marginal area of restorations. Both of these situations

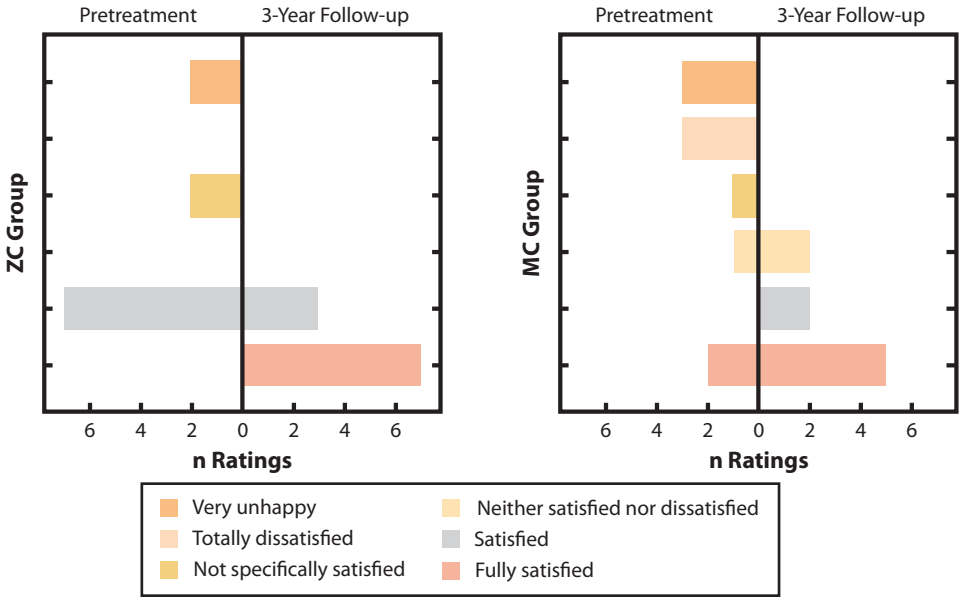

Figure 2. Outcome of esthetic rating (n=19). Colored stacks indicate frequency of different esthetic ratings.

would be more likely to affect the esthetics of metal ceramic FPDs, but such confounders were not observed within the 3- year observation period.

The purpose of this study was not to confirm differences in the clinical effectiveness of ceramic and metal ceramic CFDPs but to allow for a sample size calculation for future studies on this type of restoration. Taking into account the results of the in vitro investigations conducted in the past, material fracture (chipping) was determined to be the most suitable outcome variable for sample size calculation.

Based on the prevalence of material fractures in the 2 groups, 253 participants per group were necessary to detect a statistically significant difference between the 2 treatments with adequate power. This would translate into a high-cost multicenter study. Apart from the use of a randomized controlled design, the pilot investigation could have been conducted as a clinical feasibility study with a similar number of patients, all receiving the experimental treatment. Since experience with ZC-CFDPs was only available from in vitro studies, such a study design would have obtained knowledge about the nature and incidence of problems encountered with ceramic CFDPs. A power analysis developed from the outcomes of the feasibility study could have been used to design a subsequent analytic study, with information about the controls (MC-CFDPs) derived from the literature. By doing so, reported complication rates might have varied depending on the participant cohort and persons involved in the treatment, to name but a few possible influencing factors. With a randomized and controlled study design, the results are based on participants who can be assumed comparable for all variables except the assigned treatment. A strength of this investigation is that only 1 restoration was allowed per participant. Another strength is that the performance of FDPs was evaluated by use of the USPHS criteria. This is relevant because it standardized the differentiation of framework fractures and minor and major chipping, the most common reasons for failure of ceramic restorations. It should also be remembered that the clinician who performed the recall examinations was not involved in the treatment process. Finally, this study is the first to compare outcomes after 3 years for ZC-CFDPs and MC-CFDPs.

CONCLUSIONS

Within the 3-year observation period, the performance of both metal ceramic and zirconia ceramic CFDPs was acceptable. However, more extensive research with larger sample sizes is encouraged to confirm the long-term survival of Y-TZP hand-veneered CFPDs.

REFERENCES

1. 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;64:42-7.
2. 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;16:409-14.
3. 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;15:667-76.
4. Karlsson S. Failures and length of service in fixed prosthodontics after long-term function. A longitudinal clinical study. Swed Dent J 1989;13: 185-92.
5. Palmqvist S, Swartz B. Artificial crowns and fixed partial dentures 18 to 23 years after placement. Int J Prosthodont 1993;6:279-85.
6. Sundh B, Odman P. A study of fixed prosthodontics performed at a university clinic 18 years after insertion. Int J Prosthodont 1997;10:513-9.

7. Pjetursson BE, Lang NP. Prosthetic treatment planning on the basis of scientific evidence. J Oral Rehabil 2008;(35 Suppl 1):72-9.
8. Henderson D, Blevins WR, Wesley RC, Seward T. The cantilever type of posterior fixed partial dentures: a laboratory study. J Prosthet Dent 1970;24:47-67.
9. Nyman S, Lindhe J. Considerations on the design of occlusion in prosthetic rehabilitation of patients with advanced periodontal disease. J Clin Periodontol 1977;4:1-15.
10. Raigrodski AJ, Chiche GJ. The safety and efficacy of anterior ceramic fixed partial dentures: a review of the literature. J Prosthet Dent 2001;86:520-5.
11. Chang YY. Maximizing esthetic results on zirconia-based restorations. Gen Dent 2011;59:440-7.
12. Christensen GJ. Choosing an all-ceramic restorative material: porcelain-fused-to-metal or zirconia-based? J Am Dent Assoc 2007;138:662-5.
13. Ohlmann B, Marienburg K, Gabbert O, Hassel A, Gilde H, Rammelsberg P. Fracture-load values of all-ceramic cantilevered FPDs with different framework designs. Int J Prosthodont 2009;22:49-52.
14. Al-Amleh B, Lyons K, Swain M. Clinical trials in zirconia: a systematic review. J Oral Rehabil 2010;37:641-52.
15. Pelaez J, Cogolludo PG, Serrano B, Serrano JF, Suarez MJ. A four-year prospective clinical evaluation of zirconia and metal-ceramic posterior fixed dental prostheses. Int J Prosthodont 2012;25:451-8.
16. Sailer I, Gottnerb J, Kanelb S, Hammerle CH. Randomized controlled clinical trial of zirconia-ceramic and metal-ceramic posterior fixed dental prostheses: a 3-year follow-up. Int J Prosthodont 2009;22:553-60.
17. Guess PC, Zavanelli RA, Silva NR, Bonfante EA, Coelho PG, Thompson VP. Monolithic CAD/CAM lithium disilicate versus veneered Y-TZP crowns: comparison of failure modes and reliability after fatigue. Int J Prosthodont 2010;23:434-42.
18. Rues S, Kroger E, Muller D, Schmitter M. Effect of firing protocols on cohesive failure of all-ceramic crowns. J Dent 2010;38:987-94.
19. Silva NR, Bonfante EA, Zavanelli RA, Thompson VP, Ferencz JL, Coelho PG. Reliability of metalloceramic and zirconia-based ceramic crowns. J Dent Res 2010;89:1051-6.
20. Wolfart S, Harder S, Eschbach S, Lehmann F, Kern M. Four-year clinical results of fixed dental prostheses with zirconia substructures (Cercon): end abutments vs. cantilever design. Eur J Oral Sci 2009;117:741-9.
21. Ohlmann B, Eiffler C, Rammelsberg P. Clinical performance of all-ceramic cantilever fixed dental prostheses: results of a 2-year randomized pilot study. Quintessence Int 2012;43:643-8.
22. Rosentritt M, Steiger D, Behr M, Handel G, Kolbeck C. Influence of substructure design and spacer settings on the in vitro performance of molar zirconia crowns. J Dent 2009;37:978-83.
23. Ryge G. Clinical criteria. Int Dent J 1980;30:347-58.
24. Silness J, Loe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand 1964;22:121-35.
25. Loe H, Silness J. Periodontal disease in pregnancy I. Prevalence and severity. Acta Odontol Scand 1963;21:533-51.

Corresponding author:
Dr Wolfgang Bömicke
Im Neuenheimer Feld 400
69120 Heidelberg
GERMANY
Email: Wolfgang.Boemicke@med.uni-heidelberg.de

Noteworthy Abstracts of the Current Literature

Oral health-related quality of life in partially edentulous patients treated with removable, fixed, fixed-removable, and implant-supported prostheses

Swelem AA, Gurevich KG, Fabrikant EG, Hassan MH, Aqou S
Int J Prosthodont 2014;27:338-47

Purpose. This study investigated changes in oral health-related quality of life (OHRQoL) in partially edentulous patients treated with removabledental prostheses (RDPs), fixed dental prostheses (FDPs), fixed-removable (combined) restorations (COMBs), and implant-supported fixedprostheses (ISFPs).

Materials and Methods. A total of 200 patients (30 to 50 years old) were enrolled: 45 received RDPs, 32 received FDPs, 66 received COMBs, and 57 received ISFPs. OHRQoL was measured using the shortened version of the Oral Health Impact Profile (OHIP-14) before treatment and 6 weeks and 6 months after treatment. Treatment groups were sex-neutral; however, significant differences were found relative to age and Kennedy classification. A general linear model was used to explore the interaction of age and Kennedy classification with treatment modality.

Results. Pretreatment analysis revealed that the psychologic discomfort domain showed the greatest negative impact on OHRQoL, while functional limitation had the smallest effect. Within-group comparison revealed a significant decrease in OHIP scores throughout the study in all groups except the younger age group treated with RDPs after 6 weeks. Between-group comparison revealed significant differences among the treatment groups. The least amount of OHRQoL improvement was recorded for RDPs for both age groups at 6 weeks and for the younger age group at 6 months. There were no significant differences between FDPs and ISFPs.

Conclusions. All treatments produced significant improvement in OHRQoL. The least amount of improvement was observed in patients with RDPs. OHRQoL changes in patients treated with FDPs and ISFPs were comparable. The same treatment can have different impacts on the OHRQoL of partially edentulous individuals depending on their age and Kennedy classification.