Short Communication

Six-Year Clinical Performance of All-Ceramic Crowns with Alumina Cores

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Purpose: The aim of the study was to evaluate the clinical performance of Procera Alumina AllCeram crowns (Nobel Biocare). ***Materials and Methods:*** In 70 patients, 61 anterior and 46 posterior teeth were provided with single crowns and cemented with a glass-ionomer cement. ***Results:*** Four patients were lost to follow-up. Six crowns had to be removed, all because of nonreparable fracture. At 6 years, the cumulative survival rate was 94.3% for all crowns, 96.7% for anterior crowns, and 91.3% for posterior crowns (survival = not removed). Most of the defects occurred within the first 1.5 years. ***Conclusion:*** The findings indicate a good clinical prognosis of both anterior and posterior Procera Alumina crowns. *Int J Prosthodont 2006;19:162–163.*

The Procera AllCeram system (Nobel Biocare) is based on a well-established computer-aided design/computer-assisted machining technology.[1] One option is the fabrication of all-ceramic single crowns with dry-sintered high-purity alumina cores. Restorations can be luted with phosphate cement or glass-ionomer cement. The aim of this study was to evaluate the clinical performance of anterior and posterior crowns over a mid-term period (6 years).

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Materials and Methods

The study had been approved by the local Research Ethics Board. Patients in need of crown treatment and demanding superior esthetics were eligible for participation. Exclusion criteria included active periodontitis, current use of removable dentures, and ongoing orthodontic treatment. A total of 107 crowns were placed in 70 patients (41 women, 29 men; mean age 38.8 years) who received 1 or 2 crowns each. Incisors were the most frequently restored teeth (n = 59), followed by premolars (n = 26), molars (n = 20), and canines (n = 2). Treatments were carried out in 1997 and 1998 by 3 specially trained clinicians at the Dresden Dental School. The clinical protocol comprised chamfer preparation with rounded smooth contours, two-stage putty and wash impressions, coping designs by one of the involved clinicians, and luting with glass-ionomer cement (Ketac-Cem, Espe). The coping thickness was 0.6 mm. The crowns were veneered in a commercial dental laboratory by the same technician.

Follow-up examinations were conducted at 2 weeks, 1 year, 1.5 years, 3 years, and 6 years by 3 of the study's

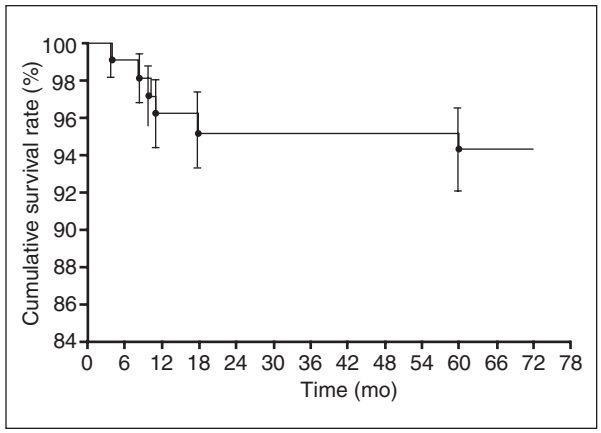

Fig 1 Kaplan-Meier survival function with standard error bars (n = 107). Survival = crown not removed.

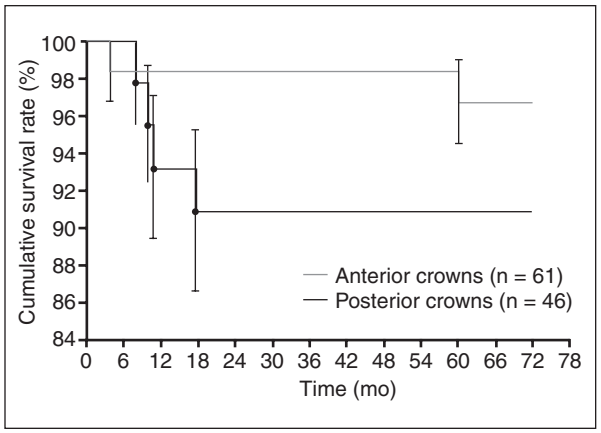

Fig 2 Kaplan-Meier survival functions with standard error bars for anterior and posterior crowns. Survival = crown not removed.

Table 1 Selected Data on Procera AllCeram Crowns

Author	Year	Observation time (y)	No. of restorations	No. of patients	Survival rate (%)
Odén et al[2]	1998	5	100	58	94.0
Ödmann and Andersson[3]	2001	5	87	50	97.7
Ödmann and Andersson[3]	2001	10	87	50	93.5
Fradeani et al[4]	2005	5	205	106	96.7
Present study	2005	6	107	70	94.3

4 practitioners, who were specifically trained as examiners for the data compilation. All complications, regardless of their nature, were recorded. Statistical analyses included Kaplan-Meier survival statistics and log-rank tests for equality of survival distributions.

Results

During a 6-year period, 4 patients (5.7%) with 5 crowns were lost to follow-up for reasons unrelated to dental treatment. No removals for reasons other than crown fracture occurred. Two anterior and 4 posterior crowns fractured and had to be removed. Four of them (1 anterior, 3 posterior) exhibited fractures of the veneering porcelain and coping, whereas 2 had fractures of the veneering porcelain only. All other crowns were followed for the 6-year timeline. The 6-year overall survival rate (survival = no removal) was 94.3% ± 2.3% (cumulative survival ± standard error) (Fig 1). The survival rate for anterior crowns was 96.7% ± 2.3%. The survival rate for posterior crowns was 91.3% ± 4.3% (Fig 2). The survival distribution of both groups did not differ significantly (log-rank test; $P = .178$). Minor fractures within the dental porcelain were found in 4 additional cases: 2 after 3 months and 2 after 6 years of service. These defects were smoothened and polished. Thereafter, the crowns functioned without further problems.

Discussion and Conclusion

The survival rates found in this clinical trial are in line with the majority of previous studies[2–4] (Table 1). The distinct concentration of defects within the first 1.5 years of service may indicate the early impact of unfavorable patient factors. Another possible explanation could be undetected clinical or laboratory shortcomings. In general, the results further strengthen the available data basis, indicating a very good prognosis for Procera AllCeram in both anterior and posterior restorations. It can be concluded that this type of all-ceramic crown may be used in all areas of the mouth, provided that clinical and laboratory instructions are followed.

References

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