



Survival of Direct Tooth Colored Dental Restorations in Frail Older Adults: a pilot study

C. Chatvanichkul (Ramathibodi Hospital, Thailand), C. Wyatt, & S. To (Faculty of Dentistry, University of British Columbia, Canada)

INTRODUCTION

Dental caries remains the primary oral health concern for older adults.(1) Dental caries increment among frail older adults in residential care is more than twice that seen among those living in the community.(2) Over a one year period, 72.1% of residential care residents developed coronal and/or root caries with adjusted carious surface increments of 2.5 coronal and 1.0 root surface.(2)

The annual failure rates of occlusal and occlusoproximal restorations vary from 1 to 3% for composite resin (3,4,5,6) and 1.4-14% for glass ionomer. (7)

The survival rate of class I and II composite resin restorations is 91.7% at 5 years and 82.2% at 10 years.(6) At 6 years survival rate of class II glass-ionomer restorations is only 60%. (14)

The replacement rate of composite resin restorations in children and adults is approximately 5% after 2-5 years. (5,10)

The median survival of composite resin and glass ionomer restorations is 11.0 and 6.8 years, respectively. (9) However, in a retrospective study of stress bearing composite resin restorations in young adults, the mean survival was only 5.0 years. (8)

The dental literature contains no studies reporting on the survival or longevity of dental restorations placed in the teeth of frail older adults.

OBJECTIVE

To determine the survival of dental restorations placed in the teeth of frail older adults within the UBC Geriatric Dentistry Program.

RESEARCH QUESTION

What is the annual survival rate of dental restorations placed in the teeth of frail older adults within the UBC Geriatric Dentistry Program?

MATERIAL & METHODS

This retrospective study utilized clinical examination data as well as billing information from the UBC Geriatric Dentistry Program (GDP) starting in 2002 and ending in 2008. At that time, 894 residents of 7 Long Term Care facilities were covered under the program, with 253 consenting to treatment, and 222 receiving dental treatment in 2002. All subjects had an initial CODE assessment (an index of Clinical Oral Disorders in Elders),(13) and received an annual re-assessment thereafter. This oral health assessment documents the presence of teeth, restorations, and dental caries. The GDP digital financial records were utilized to identify restorations placed in 2002. The tooth type (anterior, premolars, and molars), gender and age category of the subjects (65-75, 76-85, and 86-95) were also documented. Life tables were calculated from the data for Kaplan-Meier survival analysis.

RESULTS

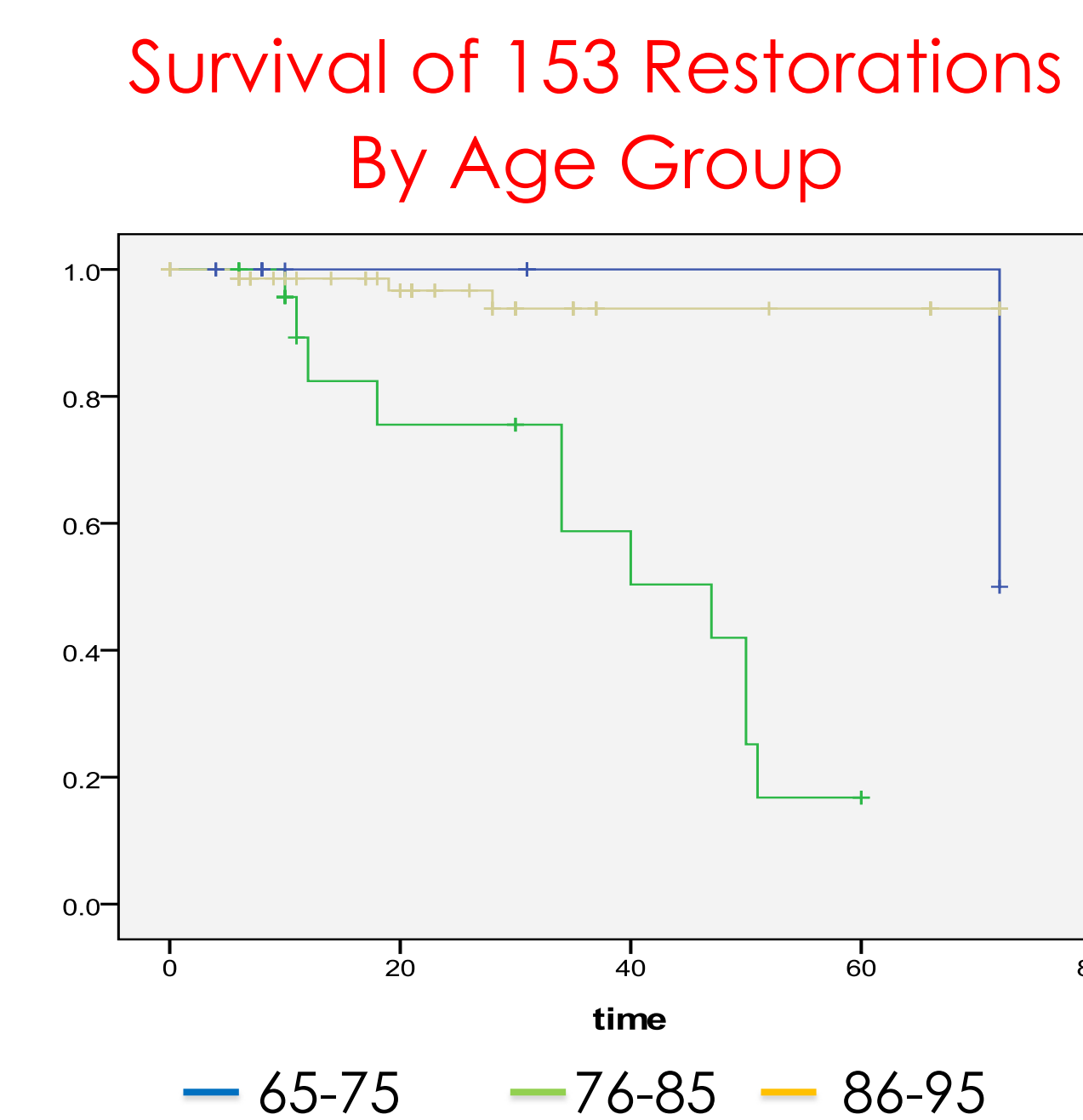
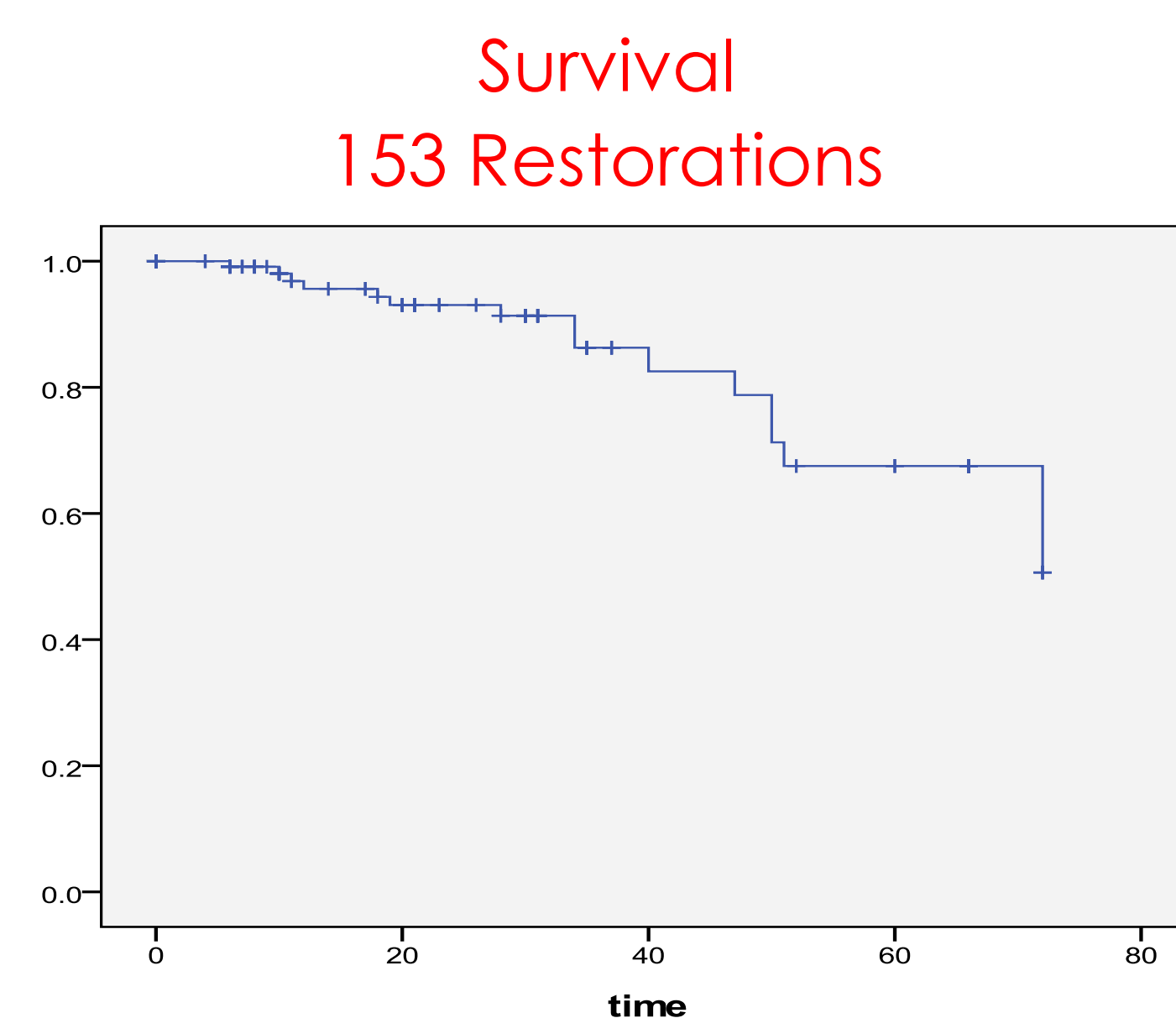
- The mean age of subjects was 84.28 years (range 69-94 years) at baseline. (Table 1)
- A total of 153 restorations were placed in 2002. The majority of restorations were anterior, one-surface, class V and in mandible. Males received fewer restorations than females, and the majority of restorations were placed in 86-95 years age group.
- Only 15 restorations failed during the six-year observation period. (Table 2) The one-year, three-year, and six-year survival rates were respectively 97%, 88%, and 64%. The average annual survival rate over the first five years was 93%
- There were significant differences in the survival curves among three age groups and gender (log rank test, p<0.05). Restorations placed in females and those aged 65-75 years had a better survival.

Table 1: A number of subjects, by age and gender for each year of follow-up

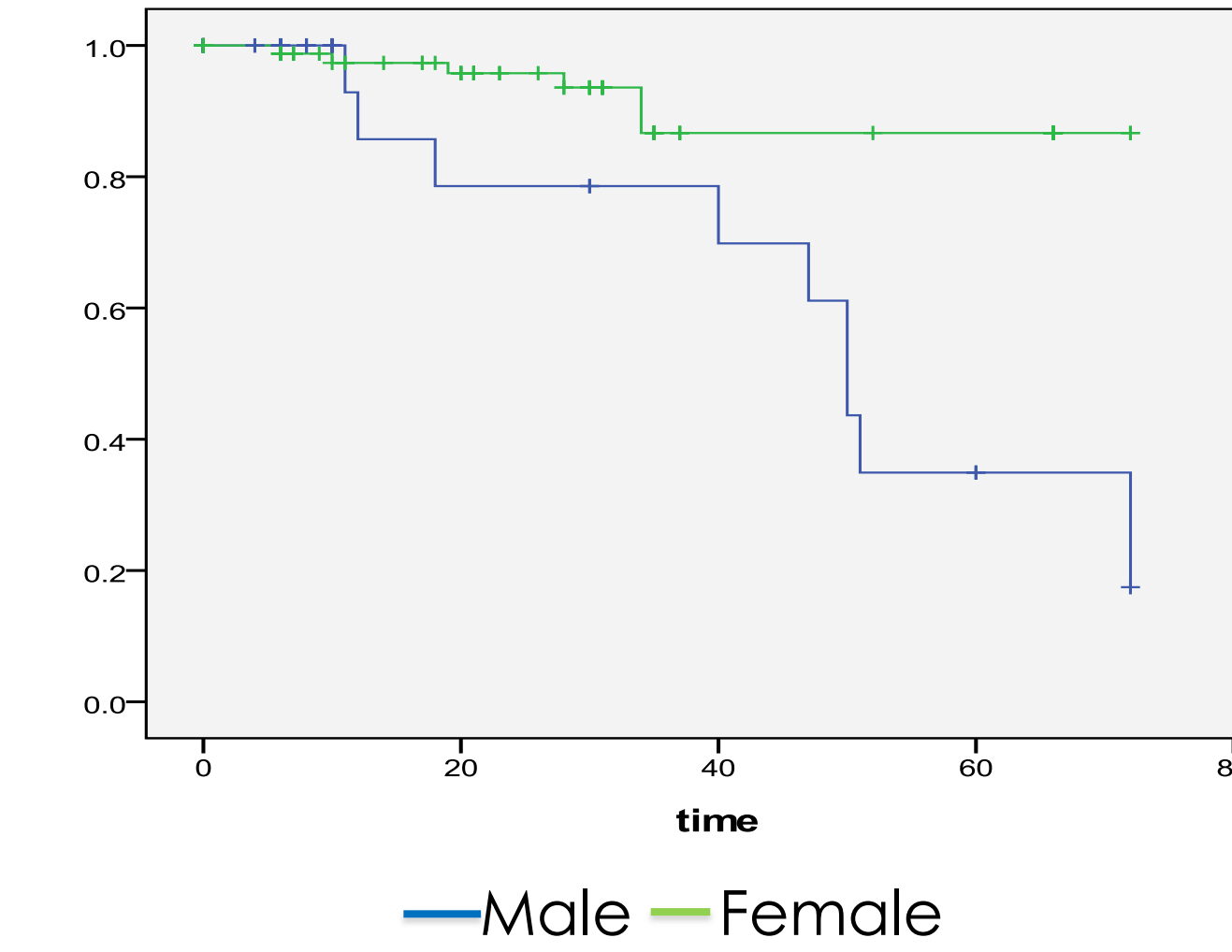
| Age | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|--------|------------|------------|------------|-----------|-----------|-----------|-----------|
| 65-75 | 5 (11.63) | 5 (15.15) | 2 (11.11) | 2 (16.67) | 1 (12.5) | 1 (12.5) | 1 (16.67) |
| 76-85 | 15 (34.88) | 11 (33.33) | 6 (33.33) | 5 (41.67) | 4 (50.00) | 4 (50.00) | 3 (50.00) |
| 86-95 | 23 (53.49) | 17 (51.52) | 10 (55.56) | 5 (41.67) | 3 (37.50) | 3 (37.50) | 2 (33.33) |
| Gender | | | | | | | |
| Male | 20 (46.51) | 14 (42.42) | 6 (33.33) | 5 (41.67) | 4 (50.00) | 4 (50.00) | 3 (50.00) |
| Female | 23 (53.49) | 19 (57.58) | 12 (66.67) | 7 (58.33) | 4 (50.00) | 4 (50.00) | 3 (50.00) |
| | 43 | 33 | 18 | 12 | 8 | 8 | 6 |

Table 2: Life-table distribution of restoration survival

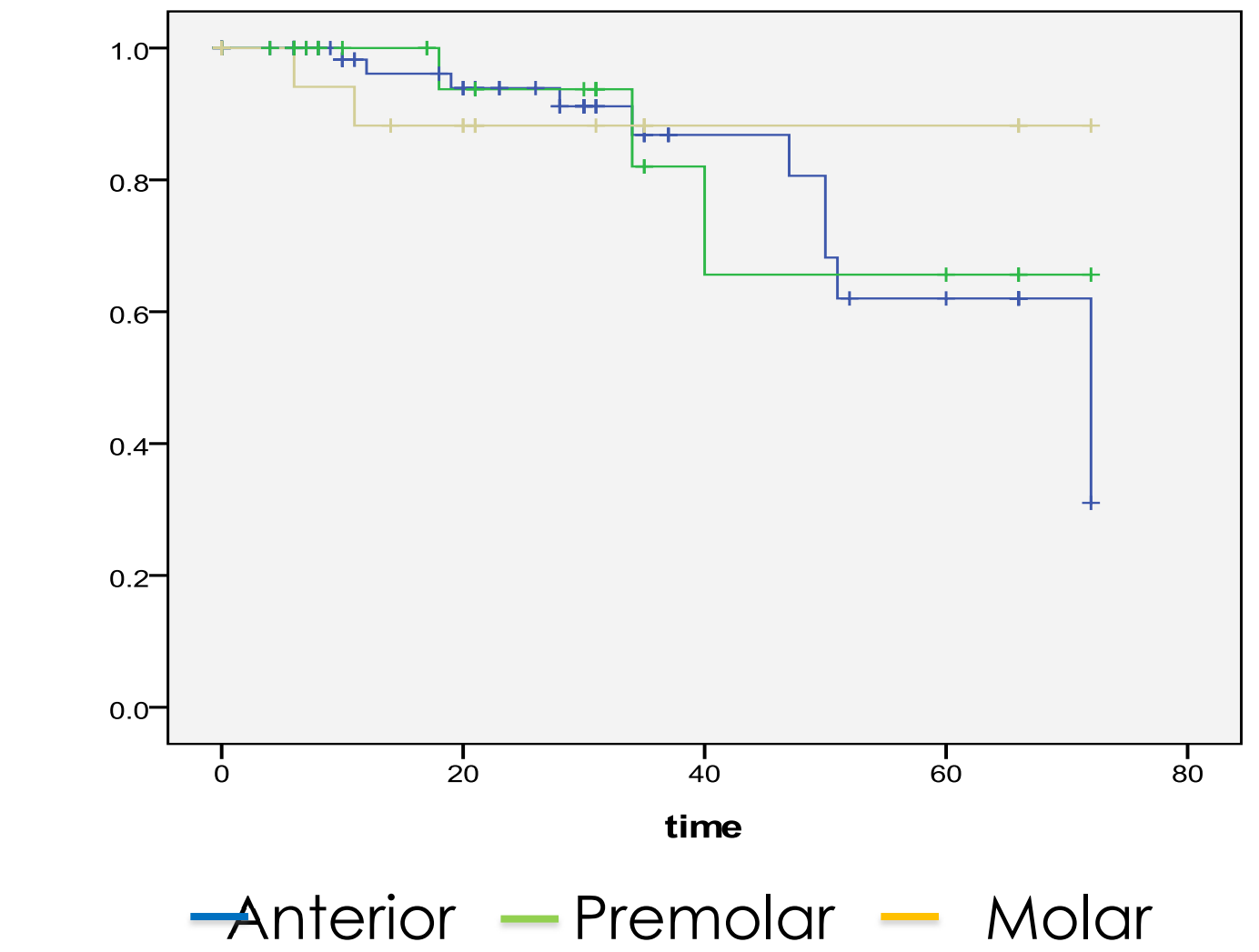
| Year | Restorations extracted & replaced | Restorations lost to follow-up | Number of Restorations placed in 2002 | Number of Restorations Surviving | % Annual Survival | % Cumulative Survival±S.E. |
|------|-----------------------------------|--------------------------------|---------------------------------------|----------------------------------|-------------------|----------------------------|
| 2003 | 4 | 38 | 153 | 115 | 96.5 | 96.52±0.03 |
| 2004 | 2 | 34 | 111 | 77 | 97.4 | 94.01±0.04 |
| 2005 | 3 | 28 | 75 | 47 | 93.6 | 88.01±0.06 |
| 2006 | 2 | 21 | 44 | 23 | 91.3 | 80.36±0.08 |
| 2007 | 3 | 0 | 21 | 21 | 85.7 | 68.88±0.08 |
| 2008 | 1 | 3 | 18 | 15 | 93.3 | 64.29±0.22 |



Survival of 153 Restorations by Gender



Survival of 153 Restorations By Tooth Type



DISCUSSION

The one-year, three-year, and six-year survival rates were respectively 97%, 88%, and 64%. The average annual survival rate over the first five years was 93%, or an annual failure rate of 7%. Van Nieuwenhuysen et al., 2003 reported an annual risk of failure of a direct restoration placed in permanent teeth of 2%.⁽¹¹⁾

Only age and gender were found to significantly affect restoration survival in this study. Other have also found that restorative material, restoration size and location, and type of tooth also affected the longevity.^(8,9) However, Opdam et al., 2007 showed no significant effect of operator, material, age or gender, whereas the number of restored surfaces did affect restoration survival.⁽⁶⁾ As well, Bernato et al., 2007 reported that the type of tooth and size of restoration had no affected the longevity of restorations.⁽⁴⁾

This study had the following limitations:

- the financial data did not include the tooth-colored restorative material and the reason for restoration replacement or tooth extraction.
- there was a high attrition rate of the elderly frail subjects over the course of the study due to death and transfer to other hospitals.

A larger sample size utilizing data from additional years is available and should be considered for further analysis to answer the research question.

CONCLUSION

The six-year survival rate of dental restorations placed in the teeth of frail older adults was 64%.

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