

## **Three years survival of ART and conventional restorations in patients with disability**

This is a clinical study approved by an Ethics Committee and registered at the Dutch National Trial Registration Centre.

**Background:** Caries can be the cause of additional distress and suffering among people with disability. Latest reviews shown that caries prevalence among people with disability is equal to lower compared to people without disability. The main differences between the two groups are the higher number of untreated cavities, the higher prevalence of periodontal problems and the lack of oral health care.

There are a number of barriers that may challenge conventional approaches in order to provide quality restorative treatment to people with disability. These are the inability to cooperate during ordinary dental procedures, the anxiety of the patients associated with needles, noises or vibration caused by rotary instruments, contamination with saliva during restorative procedures and spastic reactions or uncontrolled movements of oral muscles.

The Atraumatic Restorative Treatment, which is a preventive and restorative approach, uses manual excavation of decayed tissue and adhesive materials to restore the remaining cavity, has been extensively used in Argentina to treat caries lesions in people with disability as an alternative approach although its suitability and effectiveness has not been assessed in this population.

Therefore, the aim of this study was to assess the survival of ART and conventional restorations in people with disability referred to a Special Care Unit in a three years period.

NEXT

### **Study design**

Sixty six people with intellectual disability (with or without physical impairment) attending to 5 different day-care institutions that had been referred for restorative care to a Special Care Dentistry department of the Dental Faculty (UNC) Argentina, with at least one dentine carious lesion in a primary or permanent tooth without pulp compromise, were included in this study after signing their consent.

At a first appointment, medical history as well as clinical oral examination was recorded including presence of dental plaque, assessed according to the criteria of Greene and Vermillion and recorded using the Simplified Oral Hygiene Index (S-OHI); gingival bleeding according to the criteria of Ainamo and Bay and recorded using the gingival bleeding index and; 4) caries experience according to the WHO criteria recorded as mean DMFT scores.

Two different treatment protocols were offered by means of standardized verbal information and two validated informative brochures: The Atraumatic restorative treatment (ART), removing decayed tissue with hand instruments only and restoring the remaining cavity with an encapsulated high viscosity glass ionomer cement; and Conventional restorative treatment (CRT), using rotary instruments for caries removal and restoring the cavity with an adhesive system and resin composite.

Participants kept the brochures to read at home and at the second visit, confirmed their choice of either ART treatment or conventional treatment (CRT). Researchers recorded the reasons that led them to choose either one or the

other option, in order to identify their expectations and perceived barriers for carrying out a dental procedure.

At the second visit, the operator performed the selected treatment. This led to the following situations: 1) The patient was able to cope with the dental treatment and the operator was able to place the restorations according to standards. If further restorations were needed, additional sessions were scheduled using the same treatment; 2) The patient was unable to cope with the dental treatment and the operator was, therefore, unable to place the restorations. If further restorations were needed, treatment was programmed using the alternative treatment; 3) The patient was unable to cope with either treatments and the patient was referred for conventional treatment under general anaesthesia (GA).

The total number of restorations placed was 298: 182 ART restorations and 116 CRT restorations. ART treatment was selected by 43 participants and 15 participants chose conventional treatment in the clinic. Treatment in the clinic was deemed unfeasible for 8 patients and these patients were referred to GA for conventional treatment.

A six months follow up was settled to identify early failures or emergency cases.

### **Evaluation**

Suitability of the approaches was analyzed in terms of acceptance, feasibility and level of satisfaction.

Effectiveness of the treatment options was assessed in terms of survival of the restorations by two calibrated independent examiners at 6, 12, 24 and 36 months using established ART restoration criteria. Restorations with none or less than 0.5mm defects at the restoration margin were considered to have

survived. All other codes were considered failures. The inter-examiner consistency, expressed as kappa coefficient with a 95% of agreement ( $P_o$ ).

### **Statistical analysis**

Data were entered into a data base and analyzed using SAS 9.2 software. The Proportional Hazard Rate Regression Model with frailty correction was used to estimate cumulative survival rates of ART and CRT restorations. The Wald test was used to test for differences in survival rates. The Jackknife method was applied to calculate standard errors. Statistical significance was set at  $\alpha=0.05$ .

NEXT

### **Results**

A total of 66 patients were included in the study, 36 male (55.0%) and 30 female (45.0%), with a mean age of 13.6 ( $\pm 7.8$ ) years old.

There were 16 different principal medical diagnoses. The most common was Cerebral Palsy (39.0%), followed by Autistic Spectrum Disorder (20.0%), West syndrome (9.0%), Down syndrome (6.0%), Mental Retardation of unspecified origin (6.0%) and Rett syndrome (5.0%). Ten patients had different, less frequently occurring medical disorders (15.0%). Cerebral palsy was the most common disorder amongst patients treated with ART (51.0%) followed by the infrequently occurring disorders (17.0%). Autistic Disorder was the most common amongst those patients treated under GA (43.0%).

The survival rates and jackknife standard errors of all ART and CRT restorations over a three years period were statistically significantly different: 94.8(2.1)% and 82.8(5.3)% ( $p=0.01$ ), respectively.

The survival rates and jackknife standard errors of single- and multiple-surfaces ART and CRT restorations in primary and in permanent teeth over a three years period indicate higher success rates for single surface restorations.

#### NEXT

Of the 116 CRT restorations, 18 failures were identified: 4 in single surfaces and 14 in multiple surfaces.

Nine out of 182 ART restorations failed: 8 in multiple surfaces cavities and only 1 in a single surface cavity.

Seven restorations failed because of a marginal defect of > 0.5mm (code 2), 10 failed because of a fracture in the restoration (code 3), 5 failed because the restoration was absent, 3 because other treatment had been performed (code 5) and 2 failed because an abscess had developed.

#### **Conclusion**

The cumulative survival rates after three years show that the ART approach is an effective resource to treat caries lesions in people with disability, many of whom may have difficulties in coping with conventional treatment. However, improvements need to be introduced to enhance multiple-surfaces restorations.

The present study showed that ART restorations using high-viscosity glass ionomer survived longer than composite resin restorations over a three years period.

The ART approach has the potential not only to improve patient experience of dental treatment, but also to reduce health costs and patient morbidity by reducing referrals for GA, improving access to oral health care for this population.