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## Managing dental decay of young Aboriginal children in the Kimberley, Western Australia

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### Abstract

**Background:** Aboriginal children in the Kimberley/Pilbara region of Western Australia (WA) experience dental decay at more than 3 times the rate of non-Aboriginal children, the majority of which remains untreated. A simple alternative, Atraumatic Restorative Treatment (ART), approach to manage dental decay using principally hand instruments to prepare the cavity and without local anaesthesia in children has been shown to be successful. The approach reduced the need for specialist care, and was clinically successful, acceptable by children and parents, and cost-effective. This approach has implications for dental services delivery in rural and remote communities where access to dental care is poor. The aim of the study was to test the feasibility of the ART model of care in rural and remote communities of the Kimberley in WA.

**Methods:** The study design was a pragmatic two-armed, delayed intervention, cluster RCT. Communities with the expected number of children (n=15) in the target age (0-6-year-old) were invited to participate. Participating communities were randomised into the early intervention (test) or delayed intervention (control) arm of the study. Participating parents completed a questionnaire and the children provided with a baseline dental health assessment. Early intervention children were offered dental treatment. Delayed intervention children were advised to seek care through the standard care options available to the community and will be offered dental treatment as part of the study at the 12-month follow-up. The primary outcome was the number of children provided with the needed dental treatment and/or referred for specialist dental care.

**Results:** Twenty-six communities were selected and the majority of communities (n=25) have agreed to participate. Wide ranging community consultation and presentation of the study proposal was undertaken which included face-to-face meetings with the CEOs of the Aboriginal Controlled Health Organisations in the Kimberley as well as Chief Executive Officers (CEO) of the selected communities and Chairpersons of the community councils. An Aboriginal study reference group was formed with representation from the local Aboriginal Health Organisations. As at the end of June 2018 recruitment has occurred in 12 communities (n=150) with participation ranging from 6-24 children.

**Challenges:** Consultations with the community representatives and the CEOs and the community councils was well-received and the study proposal was supported, however, engagement at the individual level remains challenging. High mobility of the families also presented challenges in the provision of treatment and for follow-up.

## Background

Dental caries experienced by children under the age of 6 is described as Early Childhood Caries (ECC).

Early Childhood Caries has a significant impact on the quality of life of the children and their carer.<sup>1,2</sup> The child may suffer symptoms of pain and infection, difficulty in eating and sleeping, failure to thrive, missed opportunities for learning and psychological dysfunction whilst parental and family distress and financial burden have an impact. Caries experience early in life is a predictor of caries in adulthood with poor oral health significantly associated with chronic diseases.<sup>3</sup>

Children between the ages of 5 and 17 years in Western Australia are able to access dental care from either Private Dental Practitioners, at their own cost or from Government based Dental Health Services (DHS), which provides free general dental care, through the School Dental Service, from mobile vans and fixed dental clinics state-wide. These clinics are staffed by Dental and Oral Health Therapists, Dental Clinic Assistants and Dentists.

DHS also operates General Dental Clinics, in metropolitan and country locations, providing dental services to financially and geographically disadvantaged West Australians which includes holders of Health Care Cards and pensioner concession cards. Children aged 0-4 years whose parents are eligible at a General Dental Clinic are also able to access care at these clinics and the children are principally treated by dentists.

Providing dental care to young children poses challenges because of the stage of development of the young child and the limited capacity for cooperation. Commonly oral rehabilitation for children with ECC is undertaken under general anaesthesia. Dental treatment under GA does little to prevent the occurrence of new dental decay and the children are often readmitted for dental treatment, again usually under GA.<sup>4</sup> Dental care under GA is relatively expensive for the individual and for the community and is not without risk.<sup>5</sup> Recent reports suggest that oral care under general anaesthetic for young children does little to alleviate dental fear or change non-cooperative behaviour and may actually heighten child dental fear and deficits in neuro-development in children younger than 3 years exposed to GA have been suggested.<sup>6,7</sup>

Results from the National Child Oral Health Survey 2011-2014 showed that WA Aboriginal children aged 5-6 years had nearly 3 times the decay experience of non-Aboriginal children in both deciduous and permanent teeth, with most of this being untreated dental decay and possibly requiring treatment under general anaesthetic.<sup>8</sup> In WA, nearly two thirds of the Aboriginal population live in rural and remote locations, making access to specialised dental care severely limited, therefore alternative approaches to treating Early Childhood Caries are urgently required.

A pilot randomised controlled trial in WA, using a minimally invasive dentistry approach based on Atraumatic Restorative Treatment (ART) demonstrated a 44% reduction in the need for specialist care by children with ECC.<sup>9</sup>

Atraumatic Restorative Treatment is an alternative way of treating dental decay. Whereas the standard care approach to dental treatment may involve the administration of local anaesthesia and removal of the caries using dental drills, the ART approach principally relies on removing caries with hand instruments alone, preparing the tooth cavity for the placement of a restoration without the administration of local anaesthesia.<sup>10</sup> ART makes provision of dental treatment in very young children feasible, where cooperation for the standard dental care approach may be limited and it may also reduce dental anxiety and facilitate future dental attendance behaviours.<sup>11</sup>

The approach in this study is aimed at repairing the teeth without causing fear or discomfort. Hand instruments are used in place of dental drills. The use of hand instruments is less invasive and better tolerated by the patient and does not require the use of local anaesthetics.

The aim of this study will test that Aboriginal children in rural and remote locations can be provided with the appropriate dental care using the ART-based approach without the need for specialist dental treatment under general anaesthesia.

## Method

The design of The Little Kids Dental Project is a two-arm parallel cluster randomised control study. Aboriginal children aged 0-6 years living in the selected communities in the Kimberley are eligible for participation (selected on the basis of population numbers to ensure sufficient number of children in the target group are available). The communities agreeing to participate are randomised into immediate (Test Group) or delayed intervention (Control Group). Both Test and Control groups receive a baseline dental assessment by a calibrated examiner at the time of recruitment. Children in the Test Group are provided with care using the ART based approach whilst children in the Control Group continue with their standard dental care options. Parents and guardians are provided with information, consent forms and questionnaires to complete. The questionnaire collected information on childhood oral health-related quality of life, child dental fear and parent dental fear. At the 12-month follow up both groups receive a second dental assessment with the Control group offered the ART-based care and the participants in the Test group receiving any required repairs or additional treatment.

Parents from both arms of the study will be invited to participate in a Focus group interview at the 12-month follow up. Qualitative interviewing will guide the parents in sharing their thoughts and perspectives on the dental care their children have received. Effectiveness of the study will be assessed by the number of teeth treated, caries increment, changes in quality of life and the number of children referred for specialist care.

The clinical care is delivered by teams of Dental Therapists and Dental Clinic Assistants who have been specially trained in the ART approach and are all experienced in the care and management of young children in the dental setting.

An Aboriginal Research Officer (ARO) provided advocacy and cultural brokerage between the Aboriginal Communities and the research team. With a strong cultural knowledge and the ability to speak local dialects, the ARO was able to translate and interpret with study participants and families by explaining the study and assisting the participants in completing the study questionnaire.

An Aboriginal Reference Group was established with representatives from the local Aboriginal Medical and Cultural Services with input from members providing consultation and guidance to the project Investigators.

Communities invited to participate in the study were selected based on population and anticipated number of children aged 0-6 years. Advice on community selection was also sought from local health agencies, local researchers and the Aboriginal Reference Group. Based on available information on population numbers in the communities 26 communities were selected for participation in the study. Upon advice provided by the Reference Group, one community was withdrawn from the study.

Widespread community engagement was carried out during the first 12 months of the study. The study proposal was presented to Community CEO's, Chairpersons and council members through face to face meetings or 'yarning' opportunities. Information was provided about dental decay and specifically the dental disease experienced by pre-school Aboriginal children in remote locations. Study personnel explained the research project and described how participating communities would be randomly allocated to immediate (Test Group) or delayed intervention (Control Group).

Local media coverage, which included television and radio interviews, was carried out at the commencement of the study to raise awareness in the Kimberley and to invite participation. A project Facebook page was established which provided the opportunity to inform community members of the project and advise of dates, times and locations for enrolment in the project. A project logo, team shirts and banners were designed to provide the project with a unique identity.

Participating families received a \$20 store voucher at the time of recruitment and at the completion of treatment, to thank them for their time and commitment spent attending appointments and completing the questionnaires. Wherever possible the vouchers are for the purchase of goods from the local community store.

Portable dental equipment was used by the project team allowing flexibility in the locations that were accessed for use. Facilities or areas that were most accessible and provided the best opportunity for recruitment of families with young children were sought with playgroup or day care centres, class rooms, libraries, health centres, community offices and veranda space utilised.

Study personnel engage and interacted with participants, families and community members at each location. Time is spent building relationships and developing trust between the young children, the parents and the clinicians who will be providing the treatment.

An oral health resource kit called Solid Teeth, Solid Child was specially designed as part of the study project. The kit contained flash cards, designed as yarning boards and models relating to oral health promotion. Training on the use of the kit was provided by the project personnel to a local community member such as a Health Worker or a significant community member and the kit was left in the community to promote and sustain capacity building and development.

## Results

The study is now into the second year and the 12-month follow up examinations and treatment are occurring in the participating communities.

All 25 communities that were invited accepted the offer to participate in the study; 338 children have been recruited with 163 recorded as male and 170 as female (some participants did not record gender). 177 children were randomised into the Test Group and 156 in the Control Group.

The average age of the participating child was 3.5 year.

Preliminary data from the first baseline examinations indicates the study participants have three times the decay experience compared to the Australian average for children aged 5-6 yrs, and most of the decay is untreated.

## Challenges

The Kimberley region covers over 400 000square kms and is 6 times larger than Tasmania and twice as large as Victoria. Communities offered to participate in the study were located in the East and West Kimberley with distances up to 1000km between communities. Distinct Wet and Dry season conditions had to be considered when planning travel to many of the remote communities as road conditions varying constantly and road closures restrict access to communities. Community cultural events and occurrences can impact on service delivery and the study progression. Respectful acknowledgement and a capacity to be flexible and adapt to the needs of the community are critical during the times of unplanned events.

The study proposal was well received and supported by community council and parents however recruitment was challenging due to the limited time the study personnel was allocated to each community. Staff encouraged families to attend on the day in preference to the response of ‘we will come tomorrow’. Meet & Greet the Team sessions were arranged with sausage sizzles or fruit platters being offered, and a \$20 store voucher issued to participating families. Advertising flyers were displayed at the Community office, store and school prior to the study team arriving, informing of the project and inviting participation. Snowball recruiting was adopted also after the initial consenting participants for subsequent participants to join the study.

High mobility of families between communities in the Kimberley is common due to family or cultural reasons. Following up on participants for the 12-month examination will require a comprehensive approach to ensure retention of the participants. Connections and communication with community health agencies and health workers and significant community members will be maintained to assist in the tracking of the participants. The familial connections, cultural knowledge and community engagement previously established by the Aboriginal Research Officer will provide the required advocacy and support in contacting participants and families.

## Recommendations

The outcomes of the study will address the NHMRC 2013-15 strategic plan in improving the health of Aboriginal and Torres Strait Islanders through health research and its findings.

The study participants in the treatment arm have been provided with an opportunity to receive primary dental care which will test the capacity of the ART based intervention to reduce the need for specialised dental care in a hospital setting.

The study also addresses the oral health needs of priority populations identified in the Australian National Oral Health Plan 2015-24, specifically Aboriginal and Torres Strait Islander people, people who are socially disadvantaged or on low incomes and people living in regional and remote areas. This study will test the feasibility of implementing an oral health care program for young Aboriginal children in rural and remote locations and thereby facilitating research translation into policy and practice.

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## Presenter

**Sue Piggott** is a dental therapist and the Senior Dental Research Officer for the Little Kids Dental Project. Sue has many years of clinical experience and a keen interest in improving the oral health of Aboriginal children. Sue was part of the team for the National Oral Health Survey, WA component specifically visiting the Kimberley and undertook extensive community consultation and engagement as part of the survey. Sue was also a volunteer with an NGO in providing the Atraumatic Restorative Treatment among school children in Cambodia.

**Sheryl Carter** is an Aboriginal woman from the Kimberley, with links to the Wyndham area from her father's side and she is Walmajarri and Gooniyandi (Fitzroy Valley area) and Kija (Warmun area) from her mother's side. Sheryl has a keen interest in improving the oral health of Aboriginal children. Sheryl has worked as an administrative assistant with the Kimberley Aboriginal Law and Culture Centre, which is a Kimberley-wide organisation helping to maintain lore and culture in the Kimberley, and was a mentor to young Aboriginal girls through the Girl's Academy at Broome Senior High School.