Correlation of Early Childhood Caries Risk and Obesity in Preschool Age Children Via Salivary Testing

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Goal

- Develop an integrated care plan that effectively addresses shared dental caries and childhood obesity risk factors and early detection to encourage parents of disadvantaged background to adopt broad health-promoting habits.
Obesity Background

- Childhood obesity has more than doubled in children and tripled in adolescents in the past 30 years.
- The percentage of children aged 6–11 years in the United States who were obese increased from 7% in 1980 to nearly 18% in 2010. Similarly, the percentage of adolescents aged 12–19 years who were obese increased from 5% to 18% over the same period.
- In 2010, more than one third of children and adolescents were overweight or obese.
Communities with Obese children
Overweight* Children in the U.S.

(*BMI > 95th percentiles)

Early Childhood Caries (ECC)

- ECC is a chronic, highly infectious, easily transmittable disease, which can progress rapidly, and when left untreated, may result in pain, infection, and development issues.
- This is a dangerous approach to oral health since ECC can be difficult to detect until significant damage has already occurred.
Background

Early Childhood Caries    Childhood Obesity

Multifactorial Disease    Nutrition Risk Factors

Low Income Minorities Highly Effected

Surgical Model of Treating Decay has high recurrence

Weight Reduction is difficult and has high relapse

Early Prevention Needed
Key Reasons for Integration of Oral Health & Obesity Prevention

1) Children's oral health diseases (e.g. dental caries) share key risk factors with early obesity

2) Oral health promotes dietary restrictions early in childhood

3) Oral health promotion is a cultural sensitive area to discuss broad health promoting habits
Research Questions

- To accomplish the overall goal of the project, the following specific aims will be pursued:
- Specific Aim #1: will implement a health program of preventive caries risk assessment (CRA) to change the overall health promoting habits in underserved and low income children.
- Specific Aim #2: will optimize the caries risk assessment tool in a low-income population while providing means to improve preventive habits.
- This aim will test the hypothesis that cariogenic (caries associated) bacterial markers along with additional BMI related taste and dietary information will improve the diagnostic evaluation of our CRA.
- Specific Aim #3: will also investigate the hypothesized mediators of caries and BMI change in relation to our taste sensory phenotype results and cariogenic bacterial markers.
4 Pieces of Data

- BMI
- Salivary Bacterial markers
- Steptococcus Mutans, Lactobacillus
- Sensory Phenotype
- Caries Management by Risk Assessment (CAMBRA)
Implement a health program of preventive caries risk assessment (CRA) to change the overall health promoting habits in minority and low income children.

CAMBRA tool expanded to include assessing:
1. fermentable carbohydrate snacks
2. frequency of sweeten beverages
3. availability to fruits and vegetables
4. BMI information
5. Taste Phenotyping: response to a bitter taste test compound (PROP)
6. Novel Oral Bacterial Testing
Research Design & Methods

• Participants:
  • Sample size: 30-50 pediatric patients of Simms Mann Venice Family Clinic
  • Children aged 3-5 years with a Body Mass Index (BMI) of greater than 50%

**Exclude nonverbal children and siblings of participants.
Sample Question

Was the Dentist respectful and caring in discussing food choices that can improve your child’s teeth?

1. Not at All
2. A Little Bit
3. Somewhat
4. Quite A Bit
5. Completely
Outcomes: Healthy Teeth/Healthy Bodies

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Intervention

Initial Appt
Integrated Oral
Health/BMI
Plan

process evaluation
by phone

Recall Evaluation
Appt

process evaluation
by phone

Evaluation Appts (3,6,12
months)

R01 Award Period

Process Evaluation
1. Parental Recall on
Appointment Overall
Objectives
2. Parental Acceptance
of Objectives
3. Baseline Information

Long-Term Evaluation
1. Adoption of Overall Health Promoting Habits
   (e.g. servings of sugary beverages)
2. Objective measures of improvements of dental
   outcomes (e.g. Oral Hygiene Plaque Index)
3. Parental Knowledge on Nutrition Risk Factors
4. BMI related information recorded
Outcomes: Biological Risk Factors

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Intervention

Initial Appt
Integrated Oral Health/BMI Plan

Lab Bacterial Analysis

process evaluation by phone

Recall Evaluation Appt

process evaluation by phone

4-6m recall

Evaluation Appts (3,6,12 months)

process evaluation by phone

Final Bacterial Analysis

Lab Analysis

1. Novel Bacterial Screening identifying live versus dead bacterial DNA (pre-crosslinked PCR)
2. Allows for Lab Analysis of S. mutans levels at a remote location
3. Correlate BMI with ECC severity within the taste sensory phenotypes (aversion to bitter compounds).
CERP Aims

**Promote** bidirectional knowledge exchange between community and academia.

**Build** community and academic infrastructure for sustainable partnered research.

Simms Mann Venice Family (SMVF) clinic  UCLA/UMN School of Dentistry

**Drive** innovation in community engagement and education that accelerates the volume and impact of partnered research in diverse communities.

We will **implement** a health program of preventive caries risk assessment (CRA) to change the overall health promoting habits in minority and low income children.

We will **optimize** the caries risk assessment tool in a low-income population while providing means to improve overall preventive habits in a dental delivery care model.
Added-Value of CTSI funding

Established a two site clinical collaboration

UCLA School of Dentistry and School of Medicine (Peds)
Simms Mann Venice Family (SMVF) clinic

Secured a collaboration with University of Minnesota that can “accelerate design, production, and adoption of evidence-based” application to identify biological risk factors in Early Childhood Caries

Pilot Cross-Sectional Clinical Study
Next Steps and Future Plans

Get a move on it!!!!

CTSI UCLA/UMN Clinical Design

- **Intervention**
  - Initial Appt
  - Integrated Oral Health/BMI Plan
  - Lab Bacterial Analysis
  - process evaluation by phone

CTSI UCLA/UMN Clinical Design

- **R01 Award Period**
  - Recall Evaluation Appt
  - 4-6m recall
  - Evaluation Appts (3, 6, 12 months)
  - process evaluation by phone

Expanded to a single blinded RCT in R01 Grant Award Period

- **Control**
  - Initial Appt
  - Oral Health Plan
  - 4-6 month recall
  - Lab Bacterial Analysis
  - process evaluation by phone

CTSI: Clinical and Translational Research Institute

University of Minnesota
Driven to Discover
Specific Aims for the CTSI Pilot

• Can the dental/oral healthcare delivery system develop an integrated care approach that effectively addresses shared dental caries and childhood obesity risk factors?

• Since oral health promotes dietary restrictions *early* in childhood, can oral health promotion be a cultural sensitive means to address some key obesity related risk factors?

• Can oral health promotion help parents to adopt broad health promoting habits?

• Can more effective biological markers be integrated into caries and obesity related assessment?