Background

- NaF has shown limited efficacy against erosion in in vitro studies.1,2
- Association to a Ca pre-rinse has been proposed, aiming to increase intra-oral sites for fluoride retention.3,4
- Preliminary data has suggested erosion protection by calcium lactate (CaL) pre-rinse.5
- The intra-oral availability and retention of Ca and F ions is highly modulated by salivary flow-rate.6

Objective

To investigate the anti-erosive potential of a sodium fluoride rinse treatment associated or not to a calcium lactate pre-rinse, in an in vitro erosion cycling model simulating two different salivary flow rates.

Hypotheses

1) CaL pre-rinse followed by NaF rinse can increase F retention on dentin, and 2) this may increase erosion protection, particularly under hyposalivatory conditions.

Materials and Methods

Experimental Design:
Factorial 3 x 2:
- Rinse treatments:
  • 12 mM (228 ppm) sodium fluoride (NaF)
  • 150 mM (6011ppm) calcium lactate pentahydrate + 12 mM NaF
  • De-ionized water (negative control)
- Salivary flow:
  • 0.5 ml/min (normal)
  • 0.05 ml/min (low flow)
- Experimental unit: bovine tooth slab (n = 8)
- Response variables:
  • surface loss (μm)
  • KOH-soluble fluoride
  • structurally bound fluoride (μm/cm²).

Specimen preparation:

Result

Graph 1. Surface Loss (in μm)

Table 1. KOH-soluble F- and F- uptake (in μg/cm²)

<table>
<thead>
<tr>
<th>Rinses</th>
<th>KOH-soluble F</th>
<th>Struct-bound F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LF</td>
<td>NF</td>
</tr>
<tr>
<td>LF</td>
<td>0.80 (1.16)</td>
<td>0.53 (1.15)</td>
</tr>
<tr>
<td>NF</td>
<td>0.16 (1.14)</td>
<td>0.14 (1.15)</td>
</tr>
<tr>
<td>NaF</td>
<td>8.00 (1.23)</td>
<td>3.60 (1.15)</td>
</tr>
<tr>
<td></td>
<td>0.82 (1.12)</td>
<td>0.87 (1.11)</td>
</tr>
<tr>
<td>CalL+NaF</td>
<td>15.63 (1.06)</td>
<td>6.16 (1.14)</td>
</tr>
<tr>
<td></td>
<td>1.25 (1.13)</td>
<td>1.02 (1.19)</td>
</tr>
</tbody>
</table>

References


Conclusions

- The sodium fluoride rinse was able to reduce erosion progression, which was significantly higher under low salivary flow rate conditions.
- The calcium lactate pre-rinse increased fluoride availability on dentin surface and enhanced the fluoride protection against dentin erosion in low salivary flow rate conditions.

Supported by the Oral Health Research Institute – IUSD and Coordination for the Improvement of Higher Education Personnel (CAPES), Brazil.