Clinical evidence for Sylc hypersensitivity reduction

An epidemiological study\(^1\) in the UK indicated that up to 57% of people questioned claim to suffer from dental hypersensitivity (DH) and other studies (questionnaire and clinical) have indicated up to 69% of non UK populations experience some degree of discomfort from DH\(^2\).

This is explained by Brännström’s (1963) Hydrodynamic Theory of stimulus transmission across dentine\(^3\) that proposes minute rapid shifts (in either direction) of the fluid within the dentine tubules (following stimulus application) may result in activation of the sensory nerves in the pulp/inner dentine region of the tooth and today this is treated via two differing approaches:
1) tubule occlusion with a chemical or physical agent that creates a layer which mechanically occludes the exposed dentinal tubules (eg varnishes; potassium oxalate, ferric oxalate)\(^7,8\)
2) blocking nerve activity through direct ionic diffusion (increased potassium ions concentration acting on the pulpal sensory nerve activity)\(^4\) that penetrates into the dentinal tubules and depolarizes the nerve synapse, is a method used daily in toothpastes (eg potassium nitrate)\(^5,6\)

Although both approaches are effective at reducing or eliminating hypersensitivity, the duration of the relief is variable with DH re-occurring due to abrasion from excessive tooth brushing, chemical erosion or mechanical failure of the coating material\(^9\).

![Figure 1](image.jpg)

**Figure 1:** Patient sensitivity scores pre post and 10 day follow up after application of Sylc Original SR or Sodium bicarbonate (1 = low, 4 = high sensitivity using VAS, error bars = 1SD)

Therefore, there is a need for dental materials that can chemically react with dental tissues, adhering to tooth structure, so significantly reducing the possibility of re-opening occluded tubules which is now possible through the development of materials that deposit calcium phosphate onto the tooth surface to mechanically occlude exposed dentinal tubules. Such products are NovaMin (GSK, UK) that provides ions for remineralisation\(^10,11,12\) or with a differing mechanism of action, Tooth Mousse (GC, USA) provide a source of calcium for surface remineralisation.

Based on the above and supported by studies by academics and GDPs, Denfotex Research Ltd (DRL) is using Novamin particles as an air polishing powder called Sylc to provide three treatments in one application to:

(i) Decrease DH
Protect and soothe dental tissue
Recover enamel’s natural pearlescence.

The above is confirmed by clinical trials of Sylc by Banerjee et al as shown below.

Figure 1 highlights how Sylc reduces DH whereas traditional air polishing powders actually increase sensitivity as tubules are opened during the cleaning process.

Figure 2 demonstrates how teeth treated with Sylc become whiter through regaining their natural pearlescence and though not as white as after bleaching, the result is more “natural”.

### Shade Change:

<table>
<thead>
<tr>
<th></th>
<th>Average shade Pre Op</th>
<th>Average shade Post Op</th>
<th>Average shade 10 Days Post op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sylc Original SR</td>
<td>C2</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>C2</td>
<td>-2</td>
<td>-2</td>
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</tbody>
</table>

Figure 2: Shade changes (Vita Easy Shade) pre post and at 10 day follow up after air polishing with Sylc Original SR or Sodium Bicarbonate powders.

### Rapid cleaning with Sylc.

Clinical studies have demonstrated Sylc cleans much faster than conventional powders e.g. sodium bicarbonate as shown in Figure 3 where heavy staining is removed in just a few seconds application per tooth.
Sylc’s mechanism
When Sylc is applied onto the tooth surface, it reacts with saliva allowing the local release of sodium ions which raise the pH. Then the saliva is flooded with calcium and phosphate ions from the Sylc particles which precipitate onto the tooth surface forming calcium-phosphate crystals creating a hydroxyapatite –like layer over the exposed dentine and weakened enamel 14,15,16,17.

Summary
As shown in clinical trials and by patient testimonials, Sylc simultaneously reduces hypersensitivity, removes heavy extrinsic stain and “whitens” while being easy to use and provide a pleasant experience for patients.


18 A fresh approach, Kirkwood Young, Private Dentistry May 2012

19 Bio active glass air abrasion, Ed Bonner, Dental Practice March 2012