

Nova Scotia startup to sink its teeth into orthodontics market

By David Godkin

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TORONTO – What do you do when a placebo-controlled clinical trial exceeds your wildest expectations? You adjust your business plan to take a more strategic bite out of the market place. That's what Halifax, Nova Scotia-based **Photodynamic** Inc. CEO Martin Greenwood did after recording a 94 percent confidence level in his product's ability to reduce gingivitis, a traditional industry marker for gum health.

"This gave us the confidence to say, 'Rather than build this technology to take it to a consumer goods company for the consumer space, let's do this on our own and develop it for niche, high value professional markets,'" Greenwood told *BioWorld MedTech*. "A major market is in the orthodontic community and the use of brace ware that challenges their patients' ability to keep their plaque at bay."

Taking a bite out of the orthodontic market

Plaque contains bacteria that produce acids that attack tooth enamel and damage your gums. Dither about brushing or flossing to remove dental bacteria and you increase your risk of tooth decay, gum disease and tartar buildup. That risk only increases, said Greenwood, if you wear braces, which require the orthodontist to roughen up the surface of the teeth so the braces don't pop out.

"Roughening up the tooth surface also makes it a really good surface for bacteria to colonize. It effectively makes every single brace patient what we call a 'high plaque former.' On top of that, you have brackets of wires that get in the way of brushing and flossing, which again makes it hard to overcome bacterial colonization."

To safeguard teeth enamel from acidic foods and lifelong chewing action, orthodontists sometimes coat them with a thin paste or film which protects the teeth from acidity and abrasion. "There's a long history of trying to overcome this issue that way, but without any dramatic success," said Greenwood. **Photodynamic's** device eradicates dental plaque through a combination of light and an extract from the Japanese Knotweed, an invasive plant that grows wild in Nova Scotia.

The "beauty of this technology," said Greenwood is what happens when the botanical extract converted into foam is placed into the top and bottom trays of a special mouthpiece worn by the patient. Similar to the mouth guard hockey players use to protect their teeth, LED light-equipped PD Trays activate the plants' natural anti-bacterial and anti-viral properties. A minute later, the plaque is gone, said Greenwood.

"We've identified the specific wavelength of natural light activating our extract within about a 15 nanometer range and well within the visible light spectrum. There's nothing exotic; it's not UV or infrared."

"So it's very safe," VP of Clinical Development and Regulatory Affairs Alexander McLellan told *BioWorld MedTech*. "Targeted directly on the teeth makes it even safer," McLellan noted not all bacteria are the same, however; some have beneficial health effects. "This technology is preventative, but doesn't obliterate all the bacteria in your mouth."

About that consumer market

Greenwood and McLellan are gearing up for a larger, three-month clinical trial at the Boston Forsyth Institute this spring, increasing participation from 20 to 40 patients. Assuming all goes well, their first sales objective is to put the PD Foam and PD Tray into 750 orthodontist offices in Canada by 2020. What may help is the CA\$1.35 million (US\$1.01 million) in equity funding it aims to coax from venture capital groups and institutional investors outside the Halifax region. To date, the company has raised approximately CA\$1 million from the local First Angel Network Association, private investors and public sector R&D grants.

Might **Photodynamic** swing its attention from the professional orthodontic market back to the retail consumer? "The consumer market is too large for us to go on our own," Greenwood replied. A better option might be to interest a large, multinational consumer goods company to take that on, aiming the product at every person in North America who brushes and flosses, he said.

"That's a big ask. A nearer term consumer opportunity are those high plaque formers, i.e., 20 percent of the population that brush and floss regularly but still can't overcome the progression of plaque. These people go to the dentist three or four times a year for dental planing and scaling. "Eventually, we'd like to replace brushing and flossing for everyone."

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