Extracts

Hormone Could Cut Orthodontic Treatment

In the first study of its kind, University of Florida researchers are testing the power of a natural human hormone to biochemically move teeth faster and less painfully during orthodontic treatment.

"Most of orthodontics has traditionally dealt with physics, the biomechanics of applying a force against a tooth to move it," said study investigator Timothy Wheeler, a professor and chairman of orthodontics at UF's College of Dentistry. "Ours is the first study to use a naturally occurring hormone, recombinant human relaxin, to biochemically augment tooth movement and retention."

Relaxin is best known as the hormone that helps women's pelvic ligaments stretch in preparation for giving birth. It does this by softening collagen and elastin in the tissues, loosening strong, cord-like fibers until they have the consistency of limp spaghetti noodles.

That ability prompted researchers to consider relaxin as a possible way to accelerate tooth movement and prevent relapse, a condition where the tooth migrates back to its original position after braces are removed.

"You can imagine normal collagen and elastin fibers to be like rubber bands that attach to the tooth to hold it in place," said Wheeler. "Those tissue fibers resist the force of the orthodontic treatment applied to move the tooth, and, when that force is removed, say when the braces are taken off, the elasticity of the tissues springs the tooth back into position."

UF researchers will evaluate whether injecting relaxin into the gums will loosen the collagen and elastin fibers and reorganize them so teeth can move more freely into orthodontic alignment. Once the teeth have been moved, researchers will administer another injection of relaxin under the premise that it will further soften gum tissue fibers, preventing them from pulling teeth back into their original position.

The study will be the first of many to test the hormone as an orthodontic therapy, and it is hoped the drug could cut treatment time in half and eliminate the need for retainers after braces have been removed.

This may not help the more than 5 million Americans and Canadians the American Association of Orthodontists estimates currently wear braces, but if it's shown to work it could bring a sigh of relief from those anticipating future tooth-torqueing orthodontic treatment and the aching teeth and throbbing gums that often go along with it.

The patent for the drug, which received the green light from the Food and Drug Administration last April for testing in human subjects, is owned by BAS Medical, a California-based company. BAS Medical is the sponsor of the UF study, which will establish safety and proof of principle on 40 people before a series of multicenter studies could begin testing the drug on hundreds worldwide.

Researchers won't know which of the 40 subjects receive relaxin and which receive a placebo. One tooth in each subject will be targeted for movement, and subjects will wear Invisalign braces for eight weeks to move the targeted tooth. At week eight, the aligners will be removed and the teeth evaluated for relapse every four weeks for six months. As a safety measure, the week-four outcomes of the first 12 patients entered into the study will be evaluated before the remaining 28 begin treatment.

The issue of retention — a term used to indicate the tooth remains in the position to which it has been moved without relapse — is a crucial aspect of the study.

"Right now, retention is the biggest problem we have in orthodontics," Wheeler said. "I want to get completely away from retainers, which for most patients right now are a lifetime commitment."

When patients don't wear retainers as prescribed, teeth gradually relapse, nullifying years of orthodontic treatment and expense. It is this lack of patient compliance that frustrates orthodontists worldwide.

"If the results of this study demonstrate enhancement of the rate of orthodontic tooth movement and better stability after treatment, it could be an exciting new method of increasing treatment acceptability while decreasing the need for compliance," said Robert Boyd, a professor and chairman of orthodontics at the University of the Pacific School of Dentistry.

"This is the first step orthodontics has taken to deal with the biologic control of tooth movement, and what the final product will be is hard to tell at this point. Obviously, we want to make it easily available, easily delivered and as pain-free as possible," Wheeler said. "This initial proof of principle trial will help us define how to accomplish that."

Timothy Wheeler, twheeler@dental.ufl.edu

Lindy McCollum-Brounley