Journal of Nutritional Disorders and Therapy

Extended Abstract

Nutrition Congress 2015: The potential role of vitamin K2 in dental caries- Ken Southward- University of Toronto

Ken Southward

Abstract

Dental caries has traditionally been viewed as a tooth de-mineralizing process limited to the mouth. The growing interest in oral/systemic links demand new paradigms to know disease processes. New opportunities for dental research, particularly within the fields of neuroscience and endocrinology will emerge. The role of the hypothalamus portion of the brain cannot be underestimated. Under the influence of nutrition, it plays a big role within the systemic model of cavity. New understandings of oral/systemic links propose that dental caries is an uncontrolled inflammatory response controlled by the brain and moderated through the hypothalamus/parotid axis of the endocrine system. Currently, the normal theory of cavity considers only the oral environment and doesn't recognize any significant role for the brain. The healthy tooth, however, features a centrifugal fluid flow to nourish and cleanse it. This is moderated by the hypothalamus/parotid axis which signals the endocrine portion of the parotid glands. High sugar intake creates an increase in reactive oxygen species and oxidative stress in the hypothalamus. When this signalling mechanism halts or reverses the dentinal fluid flow, it renders the tooth susceptible to oral bacteria, which may now attach to the tooth's surface. Acid produced by oral bacteria such as Strep Mutans and lactobacillus can now de-mineralize the enamel and irritate the dentin. The acid attack stimulates an inflammatory response which ends up in dentin breakdown from the body's own matrix metalloproteinases. Vitamin K2 (K2) has been shown to have an antioxidant potential in the brain and may prove to be a potent way to preserve the endocrine controlled centrifugal dentinal fluid flow. Stress, including oxidative stress, magnifies the body's inflammatory response. Sugars can not only increase oral bacterial acid production but also it concurrently reduces the tooth defences by endocrine signalling. Saliva production is the exocrine function of the salivary glands. The buffering volume of saliva is acute to neutralizing the oral environment. This minimizes the de-mineralization of enamel and enhances its re-mineralization. K2, like that found in fermented cheese, recovers salivary buffering by its influence on calcium and inorganic phosphates stashed.

Data collected from numerous selected primitive cultures on the point of civilization established the difference in dental health thanks to diet. The basic diet group had scarce carious lesions when compared to the group which consumed a civilized diet high in sugar and refined carbohydrates. The primitives were ready to include the fat soluble vitamins, specifically K2, in their diet. More endocrine and neuroscience research is important to rose understand how nutrition influences the tooth's defences through the hypothalamus/parotid axis. It will also link cavity to other inflammation related degenerative diseases like diabetes. The role of reactive oxygen species in the hypothalamus is a signalling factor in establishing tooth vulnerability or resistance. Vitamin K2 appears to have a significant antioxidant role in the brain as well as a key nutrient in the management of calcium in the body including bones and cardiovascular tissues. K2 works together with calcium and vitamin D. This systemic paradigm of dental caries places nutrition on the leading edge of prevention because it is focused on the cause of the disease rather than traditional preventive efforts focused on the symptoms. K2 also appears to have a potential salivary buffering role in the exocrine portion of the parotid gland as well as the other salivary glands. In this systemic paradigm, the potential preventive role of nutritionists and public health professionals is elevated to unprecedented levels. Working to widen existing dental recall programs beyond a sign focus will show welfares but will probably have to be driven by public education programs.

Some of the most revolutionary concepts in dentistry, such as dental implants and nickel-titanium metals in orthodontics and endodontics have their roots outside dental research. Data exists to support the systemic theory of dental caries and K2 as a critical component. Bringing dentinal fluid flow research up to date in the lab by substituting K2 and other antioxidants for carbamyl phosphate is the first step in proving this hypothesis. Re-evaluation of Price's data is important as Activator X is now associated with K2. Determining a community evaluation group to test this hypothesis would be necessary. The objective would be seeking to halt the dental caries process in a study group since it would be virtually impossible to assemble a group of "never decayed" without many confounding factors. To minimize compliance issues, a controllable group such as the armed forces might be

Ken Southward
University of Toronto, Canada

an appropriate place to start. Nutritional supplements, placebos and no supplements would differentiate the three test groups. Staff dentists could determine base line measurements and on-going changes. Another option might be school age children who could volunteer to take their supplements at school. Changes will happen faster in younger children with more rapid metabolisms than adults. It would be monitored by dental public health teams.

Nature has provided the evidence to prevent dental caries. Nutrition is the dominant factor in this process. It affects the endocrine aspects of enhancing the tooth's defences by maintaining a nourishing dentinal fluid flow. The exocrine aspects of salivary glands or saliva secretion and composition are also nutritionally related. In terms of prevention of dental caries, optimum nutrition with fat soluble vitamins like K2 plays a far more significant role than the traditional dental recommendation to simply eat less sugar to minimize oral bacterial acids. Dental disease will be recognized as another inflammation related degenerative lifestyle disease like cardiovascular disease, osteoporosis and diabetes.

Who will lead this new nutrition paradigm? Will a field of 'neurodontics' emerge as dentists expand their research to include the brain? The dental profession has an advantage in application because optimal nutrition can be added to the beneficial 'cradle to grave' services presently being provided. The impact, however, may be felt well beyond dental disease. It could affect all degenerative diseases that are inflammation based. Expanding beyond the silo of the oral cavity may meet some resistance. Alternately, other disciplines such as nutritionists may offer dental nutrition programs that may prove more effective than present dental prevention programs. In the end, public health teams may play the key role.

Note: This work is partly presented at 4th International Conference and Exhibition on Nutrition, October on 26-28, 2015 Chicago, USA