

# Crooked Teeth AND Nutrition



by Dr. Steven Lin

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I'd always loved my work as a dentist, but as time went on, my days began to feel hopeless. Day after day, I would see patients with rotten, crooked and infected teeth. I was fixing problems, but it felt like plugging holes in a boat heading for a waterfall. Dental health was still getting worse, both among my patients and in society. I became frustrated with my practice.

Among cavities, bleeding gums and crooked teeth, I saw people with sick mouths and sick bodies. But people could rarely see the connection between the two and just accepted dental disease as a normal part of modern life.

However, a few people were seeking answers. Parents would ask *why* their child's teeth were crooked, making me uneasy because I'd asked this, too—and didn't have the answers. My training hadn't provided them.

The turning point came when I was taking some time away from practicing. By chance, I discovered Weston Price's *Nutrition and Physical Degeneration*, first published in 1939. His words hit me like a lightning bolt; here was a dentist who seemed to have the same concerns and questions I did. His book proclaimed to have the answers.

At first, I couldn't understand his conclusions. Crooked teeth were due to diet? How could it be true? I was compelled by Price's ideas, but my training was telling me to be skeptical. That conflict started me on my journey to understand the puzzle he'd assembled. I spent the next few years trying to fill the gaps between his time and mine.

Price described the patients he saw as sick; I, too, was seeing many children with long, skinny faces, open mouths and tired eyes. Their palates are narrow and high, and their teeth are cramped and crooked. These kids would become adults with other chronic diseases.

Price's message was clear. The mouth-body connection was far more important than previously thought and diet was the core contributor to straight teeth.

### An absence of 'why?'

If you look through dental textbooks, you won't find a solid definition for crooked teeth. I was certainly surprised—I'd go back to the index and chapters, sure I'd missed something. But I soon realized I hadn't. In my training, there was very little discussion on why crooked teeth occurred.

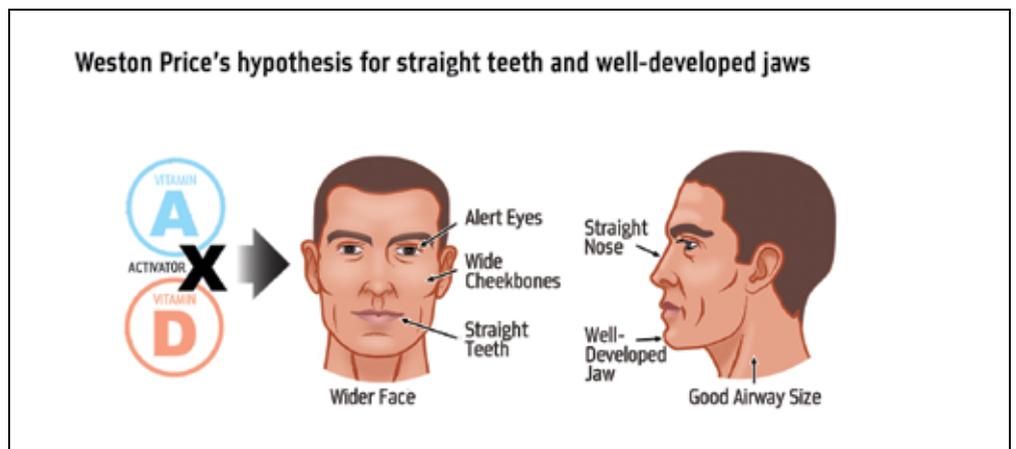
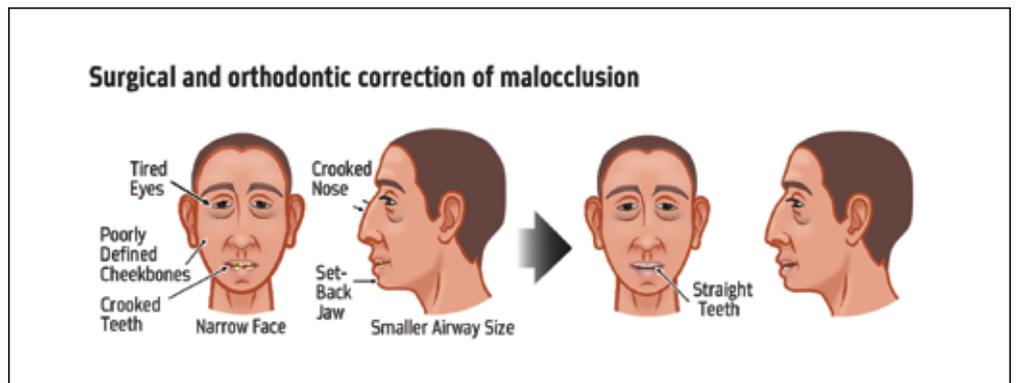
In my practice, I would diagnose, classify and plan treatment for crooked teeth and impacted wisdom teeth. However, I would never say why it occurred in the first place, or how it might affect the rest of the body. The truth was, I didn't know how. One of the big dental care problems since Price's era is that we haven't learned why crowded teeth happen.

### A whole new world: Functional dental growth

Today, the way we understand dental arch growth has exploded. Crooked teeth and impacted wisdom teeth are the endpoint of poor skeletal growth. Our teeth are the victims of the platform they live in.

Now, when a child walks into the dental practice, crooked teeth can be assessed in a new way. Dental growth is a function of breathing, airway and postural influences on teeth. Jaw growth is directed by feedback from the tongue, nasal airways and facial muscles.

Think of your teeth as the ball in a football game: They're being kicked around by the forces of the tongue, breathing and facial muscles. The dental arch isn't



passive, but a functional feedback system. That's why if you don't wear a retainer after treatment with orthodontic braces, the teeth can move because of an underlying functional problem.

Nasal breathing has an expansive force on the upper jaw.<sup>1</sup> Your tongue should press up against the palate, which forms the floor of the nasal airways. These forces, with proper closed lip and muscle posture, influence the growth of "straight" teeth.

### Every moment matters

Let's go right back to the start of the problem and really understand how crooked teeth happen. Breastfeeding is a major influence on jaw growth and trains a child in nasal breathing. Their tongue extracts milk by pushing the nipple to the roof of the mouth. These forces expand their palate. Breastfeeding has been shown to decrease the risk of crooked teeth.<sup>2</sup> It's the start of a lifetime of factors that influence jaw size.

A child's ability to breastfeed may be due to his oral development. Ideally, the first dental exam should occur right after birth, revealing oral restrictions such as

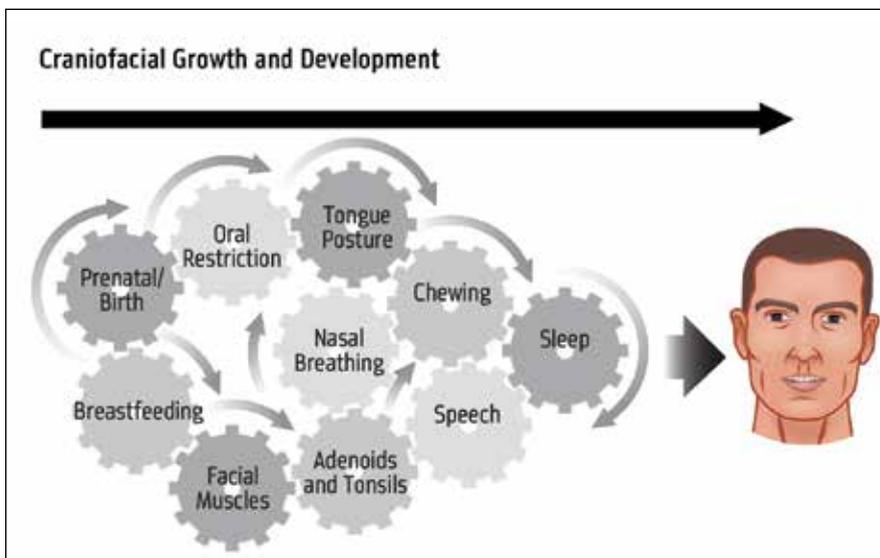
tongue or lip ties, which could hinder the ability to push the tongue against the palate.<sup>3</sup> Dentists, surgeons and ENTs can now diagnose and release tongue ties to assist with breastfeeding.

After breastfeeding, children continue to develop their oral muscles, lip closure, tongue posture (sitting against the palate) and breathing, which influences their growth. The standard orthodontic approach has been to delay action until the adult dentition has formed. In some cases, teeth are extracted and the remaining teeth straightened with braces to fit into small jaws. However, this approach fails to address what caused the problem in the first place.

Small jaws prevent us from breathing properly, and sleep disorder rates have increased in the past two decades.<sup>4</sup> Without the frame to support airways when muscles relax at night, we are starving our brains of oxygen. The end stage is obstructive sleep apnea, which is linked to high blood pressure, heart failure<sup>5</sup> and brain disease.<sup>6</sup> Upper airway resistance, meanwhile, is a lesser recognized and diagnosed breathing disorder.<sup>7</sup> It's also a driver of digestive disorders, anxiety, poor circulation and a host of other symptoms.<sup>8</sup>

Our airways aren't only stuck in small jawbones. They also have swollen soft tissues. In many people, especially children, airways are also inflamed, swollen and clogged with mucus. Allergic rhinitis, asthma, and swollen adenoids and tonsils are barriers to nasal breathing.<sup>9</sup>

The oral and gut microbiome plays a crucial role in how bacteria mediate the immune response. Since 2008, the scientific world has been sequencing this foreign yet symbiotic organ that lives in the body. Imbalanced microbes cause intestinal barrier dysfunction, which is linked to digestive, autoimmune and metabolic disorders.<sup>10</sup>



The umbrella of crooked teeth has far-reaching health problems, but expansive airway-focused orthodontics can guide jaw growth.<sup>11</sup> This not only straightens teeth but also considers facial and airway development.

Childhood dental development can now be guided by a team right from birth. This includes lactation consultants, dentists, myofunctional therapists, airway orthodontics, sleep physicians and ENTs. Functional oral health has helped us see crooked teeth are *not* inevitable.

***“Crooked teeth are a solution for a complex system to remain in homeostasis even when some of its components are imbalanced. When you’re building a house, you start by building the foundation, then the roof, and so on. The last thing you work on is the interior—which is the teeth.”***

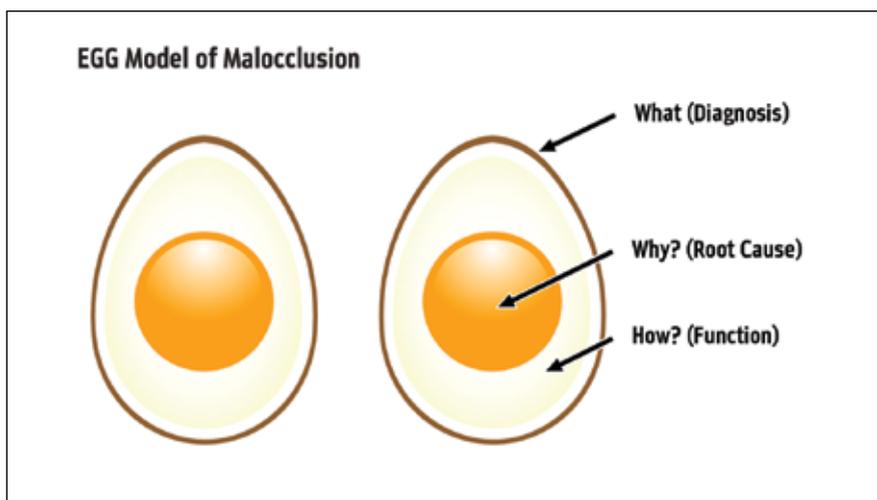
— Dr. Dave Singh

### Searching for the ‘yolk’

The fluid model of jaw and facial growth digs deeper into *how* crooked teeth occur. But it doesn’t answer *why*.

This is where Price was well ahead of his time—he had found the why. Now we need to connect his theory to what science has since revealed. Anthropologists including Robert Corruccini have confirmed that malocclusion is linked directly to historical changes to the human diet.<sup>12</sup> The human fossil simply lacks crooked teeth before farming and industry.

An evolutionary, ancestral perspective is an important missing piece of the puzzle. It also helps us to dig past the egg white layer.

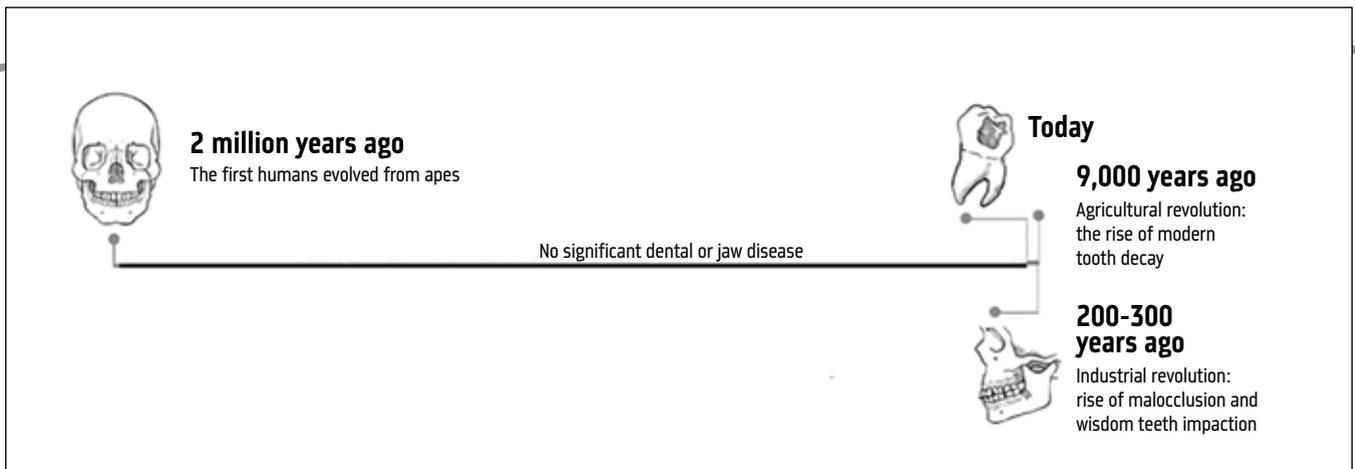


In modern day, it may be that neonatal jaws are failing to develop in the womb when the fetus goes through 3-D skull growth.<sup>13,14</sup> Pregnant women have a higher risk of sleep apnea,<sup>16</sup> and a mother with crooked teeth may deliver less oxygen to her child. We know the relationship between low oxygen and fetal growth. This could be similar to smoking during pregnancy, which curbs fetal growth.<sup>15</sup> Mothers with small jaws may have kids with small jaws. But why didn’t the jaw grow in the first place?

Malocclusion is linked to a major change in our food supply. The cranial and jaw development problems I see are linked to our diet. Price had figured this out—his theory is our yolk.

Throughout human history, a typical diet delivered foods rich in the fat-soluble vitamins A, D and K<sub>2</sub>. Today, these vitamins are sadly lacking from the modern diet. Vitamin D deficiency has been dubbed a global pandemic.<sup>17</sup> Price’s work inspired me to begin testing all my patients with tooth decay, gum disease and malocclusion; all were insufficient, and some were deficient in vitamin D.

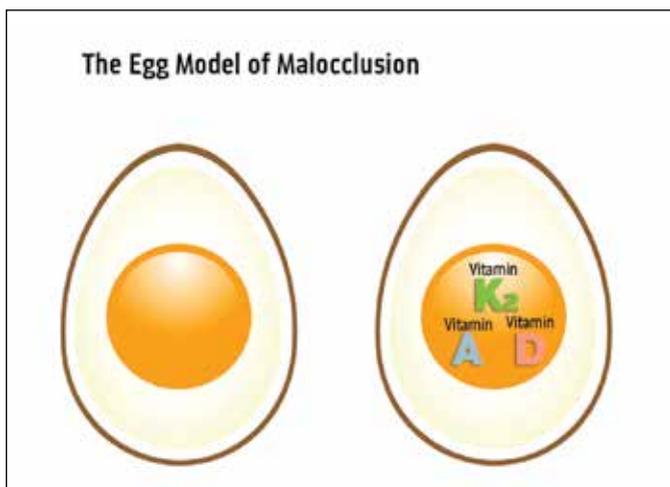
Price also noted the importance of prepregnancy nutrition. Vitamin D intake



starts in utero and the mother continues passing vitamin D to her child if she breastfeeds.<sup>18</sup> In children, low vitamin D levels have been related to tooth decay,<sup>19</sup> and adequate vitamin D may be linked to lower rates of decay.<sup>20</sup> A small amount of research has shown supplementation may prevent caries.

Bone growth is being directed by a child's stores of vitamin D, and a deficiency in children is known to cause growth retardation.<sup>21</sup> Vitamin D also directs cellular growth, binding to and influencing thousands of genes.<sup>22</sup> And perhaps critically, deficiency in vitamin D directs the epigenome.<sup>23</sup>

For a long time, Price's fat-soluble vitamins theory lacked a physiology model to support it. However, with the help of many arms of science, we now understand crooked teeth as a food-driven outcome.



## The traffic lights of growth and development

To better understand crooked teeth, let's look at how the human body develops right from birth.

As the fetus grows, it develops different systems, such as the spinal cord, skeletal system and organs, in an established order, with progress checkpoints. However, if one part of the body hasn't finished, it can't afford to wait. The show must go on.

For instance, spina bifida happens when the neural tube fails to close. These checkpoints occur around the 23rd and 27th days of pregnancy.<sup>24</sup> With adequate folate, a building block of the nervous system, the body completes its work correctly and moves onto other systems. Without enough folate, the job is left incomplete, and the child with an exposed spinal cord.

As the craniofacial system develops, it too has a series of progress checkpoints. When a child reaches a certain stage, whether inputs have been sufficient or not, the growth stages move on. A small or narrow dental arch has been left unfinished like a spinal cord in spina bifida.

## Fat-soluble vitamins—the bricks and mortar of teeth

Price's theory centered on the trilogy of fat soluble vitamins. K<sub>2</sub> wasn't identified as Activator X until 2007 by Chris Masterjohn. Masterjohn has since fleshed out much of their three-way synergy in the body.

Now we have reached the final pieces of the puzzle. Let's look at the ways that these vitamins work together to direct bone and teeth growth.

## Vitamin D

Vitamin D deficiency and its impact on the skeletal system is firmly established. Osteoporosis and rickets in children (which occurs when bones don't mineralize properly) are well known. Vitamin D is the main conductor of minerals in the body and vital for calcium balance.

Ninety percent of the population now has impacted wisdom teeth. Jaw growth, like any other bone growth, is three-dimensional. In order to erupt, teeth rely on overall space in the jaw length, but also the width of the bone.<sup>25</sup>

To gain width, the bone must go through appositional growth. This builds bone thickness during late-stage jaw development and houses the wisdom teeth.<sup>26</sup>

Today, many children's bodies seem to lack both the raw materials and the signals to continue this growth process. The jaw bones are less developed in all dimensions and wisdom teeth simply don't fit.

## Vitamin A

While bones are growing, they must remain functional. Growing bones must also support joint movements. Bone growth is a material-hungry remodeling process that must break up active bone before adding new layers.

Price established the absence of foods rich in vitamin A in the modern diet. Vitamin A activates osteoclasts that disrupt these bony surfaces to stimulate growth.<sup>27</sup> Vitamin A also influences gene regulation, vision, reproduction, cell division and cell differentiation, and works with vitamin D throughout the body.<sup>28</sup>

## Vitamin K<sub>2</sub>

While vitamin D supplies the materials, vitamin A supplies the workers that keep the process running. Together, they activate the proteins that stimulate demand for vitamin K<sub>2</sub>.<sup>29</sup>

Like vitamins D and A, vitamin K<sub>2</sub> is passed on to children by their mothers.<sup>30</sup> Vitamin K<sub>2</sub> activates the protein osteocalcin, which carries minerals into bones. Once osteocalcin is activated, its calcium receptors open and carry minerals into the bone and

teeth.<sup>31</sup> It also works with vitamin D in osteoblasts to produce bone.<sup>32</sup>

Vitamin K<sub>2</sub> also activates MGP protein, which stops minerals from going into the soft tissues, including vascular tissues.<sup>33</sup> Rats show that septal calcification may cause a deviated septum, which may prevent the functional growth of the maxilla by reducing nasal breathing.<sup>34</sup> However, studies need to confirm this relationship.<sup>35</sup>

All three fat-soluble vitamins are the heart of our yolk—Price's theory. (And they're also all found in egg yolk.)

## The nutritional model of malocclusion

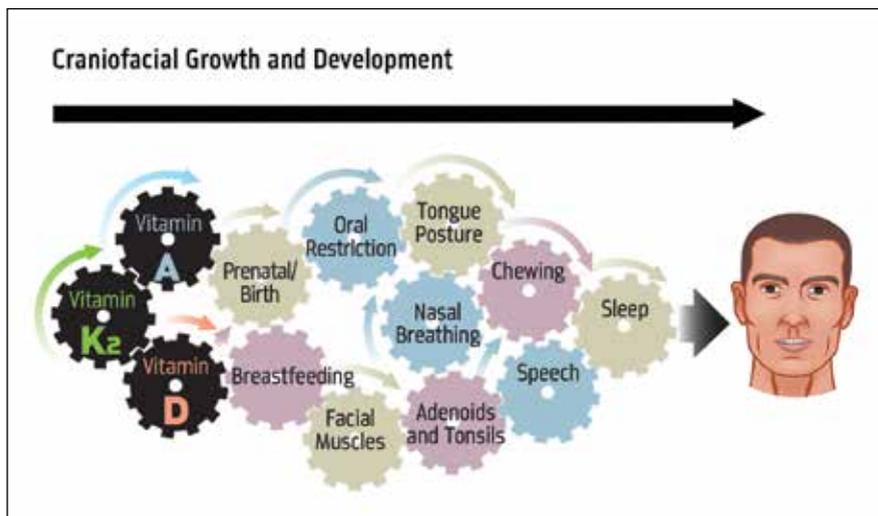
Food is the primary cause of crooked teeth. Oral health should be our primary concern when creating dietary guidelines.

Many factors combine to influence jaw and teeth growth, and many nutrients combine to influence the body and its development. To date, nutrition research has focused on one vitamin's action and one outcome; however, the fat-soluble vitamins work together in a system. A reductionist approach that studies how nutrients work in isolation fails to account for the complexity of the human growth and development.

Price taught us to look at the body and the mouth as a whole system. Today, with the benefit of ancestral factors, the human microbiome and epigenetics, we can progress forward with a complete explanation for his theory. ■

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