

OPTIMAL HEALTH UNIVERSITY™

Presented by Dr. Wayne Terai

Tylenol® Linked With Asthma

The prevalence of asthma has rocketed since the 1960s and 1970s, particularly in Western industrialized nations and among young children. While there are no definitive explanations for this increase, researchers have sought clues in our modern environmental conditions, our behaviors, our nutritional habits and even our genes.

Of particular concern to Dr. Terai are findings of a recent meta-analysis linking asthma with the use of Tylenol® (acetaminophen or paracetamol) (CHEST 2009;136:1316-23).

Asthma Overview

Approximately 8.5 percent of children and 6.7 percent of adults suffer from asthma (*MMWR* 2007;56:1-14, 18-54). The mystifying disorder afflicts approximately 150 million people around the world.

Asthma, as a known affliction, is as ancient as recorded history. Documented evidence of the disease exists from many early civilizations, including Egypt, China, India, Greece and Rome. The English term stems from the Greek verb *aazein*, “meaning to exhale with open mouth, to pant,” and was identified, among other ancient authors, by Hippocrates, Aretaeus of Cappadocia and Galen (*J Asthma* 1982;19:263-9).

“Asthma is a chronic inflammatory disorder of the airways characterized

by episodic and reversible airflow obstruction and airway hyperresponsiveness. Clinical manifestations include wheezing, coughing, and shortness of breath” as well as a tightening in the chest. Symptoms are often exacerbated at night and early in the morning, and asthmatic attacks may be triggered by allergens, chemical and environmental irritants, respiratory infection, exercise and certain medications (*MMWR* 2007;56:1-14, 18-54).

Researchers no longer view asthma as “one unifying disease” — a concept that “is disappearing further into the realm of historical oversimplification.” Today, it is believed that both genes and the environment play a role in etiology and that such interactions either prenatally, in early childhood or as an adult influence the later development of an asthmatic condition (*Lancet* 2008;372:1009). “Clear evi-

dence now suggests that asthma is a heterogeneous and genetically complex disease (>100 genes have already been implicated) that cannot be explained by one mechanism alone.” (*Lancet* 2008;372:1107-19.)

“Progress in understanding asthma and its underlying mechanisms is slow; treatment can be difficult and response unpredictable; and prevention or cure is still a pipe dream. Asthma, one of the most important chronic diseases, remains a genuine medical mystery.” (*Lancet* 2008;372:1009.)



The Jump from Aspirin to Tylenol®

In the 1980s, Tylenol® (acetaminophen or paracetamol) supplanted aspirin as the pain-relieving and fever-reducing drug of choice for children. This was a direct response to findings of case-control studies connecting Reye Syndrome, a potentially life-threatening condition affecting the liver and the brain, with the use of salicylate drugs such as aspirin (*Pediatrics* 1980;66:859-64; *JAMA* 1982;247:3089-94).

Natural Alternative to Pain Medication: Chiropractic Care From Dr. Wayne Terai

The new research is alarming, but not to many chiropractic patients, who have avoided pain medication with preventive chiropractic care. Chiropractic focuses on alleviating dysfunctional segments in patients' spines called **vertebral subluxations**. This common condition is linked with a vast array of health conditions. Fortunately, Dr. Terai uses gentle and effective maneuvers called **chiropractic adjustments** to correct vertebral subluxations, in turn often eliminating the need for pain medication.

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Pharmaceutical companies promised additional benefits as well: Unlike aspirin, acetaminophen does not irritate the stomach, inhibit blood clotting or trigger aspirin-induced asthmatic episodes in the approximately 10 percent to 20 percent of asthma patients who are sensitive to aspirin (*CHEST* 2000;118:1470-6).

The Research: Does Tylenol® Cause Asthma?

Although a link was initially suggested as early as 1967 (*CHEST* 2005;127:604-12), it was not until the past decade that researchers closely examined the possibility that acetaminophen causes asthma.

In 1998, researchers in Ohio offered suggestive evidence based on epidemiologic trends in children, and the known effects of aspirin versus acetaminophen on the lungs (*Ann Allergy Asthma Immunol* 1998;81:347-51).

In 2000, researchers in London released even more compelling data demonstrating this relationship in adults and noting that it appears to be dose-dependent: “Paracetamol use was positively associated with asthma. ... This association was present in users and non-users of aspirin and was stronger when cases with more severe disease were compared with controls; amongst cases increasing paracetamol use was associated with more severe disease.” (*Thorax* 2000;55:266-70.)

Recent studies extended these initial findings, including showing “an association between paracetamol consumption during late pregnancy and the prevalence of wheezing in infancy and childhood” (*Int Arch Allergy Immunol* 2009;149:33-7; *Ann Allergy Asthma Immunol* 2008;101:271-8) and the “use of paracetamol in the first year of life and in later childhood ... with risk of asthma, rhinoconjunctivitis, and eczema at age 6 to 7 years.” (*Lancet* 2008;372:1039-48.)

The Latest Study

A just-published review by researchers at the University of British Columbia in Vancouver pooled data on 19 studies conducted between 1966 and

2008. The analysis, which included 425,140 people, concluded that the use of acetaminophen appears to increase “the risk of asthma and wheezing in both children and adults.” (*CHEST* 2009;136:1316-23.)

Specifically, the risk of asthma jumped by 60 percent in children who took acetaminophen in the year prior to being diagnosed. Children whose mothers took acetaminophen while pregnant had a 30 percent heightened risk of asthma and a 50 percent bolstered risk of wheezing. Adults who reported taking the medication were 74 percent more likely to have asthma, compared with adults who did not take acetaminophen.

A Potential Pathway

How does acetaminophen trigger asthma? Researchers have several hypotheses.

For instance, unlike other medications, acetaminophen does not inhibit cyclooxygenase, the key enzyme involved in the inflammatory response of asthma. This may be one explanation for the potential link.

Another explanation involves an antioxidant chemical called glutathione. Glutathione is produced by the body and found in the fluid lining the respiratory tract. It works to protect lung tissue against oxidative damage and “plays a role in drug detoxification, particularly in the metabolism of acetaminophen.” (*J Allergy Clin Immunol* 2005;116:859-62.)

“As the purpose of the lungs is to permit transfer of gases including oxygen, they are exposed to higher concentrations of oxygen than other tissues, are hence more at risk of oxidant-induced injury and thus require antioxidant defenses to prevent permanent tissue damage.” (*Clin Exp Allergy* 2005;35:700-2.)

Acetaminophen has been shown to reduce glutathione levels in laboratory studies involving animals as well as laboratory specimens of human lung tissue (*Int J Biochem Cell Biol* 2005;37:1727-37).

Researchers hypothesize that glutathione depletion “predisposes the cells to the toxic action of other pneumotoxins or air pollutants” and “contribute[s] to impaired antioxidant defense in the lung, which may predispose [lung cells] to damage by free radicals, and potentiate the inflammatory responses. These effects may have relevance in relation to the putative role of [acetaminophen] in asthma.” (*Int J Biochem Cell Biol* 2005;37:1727-37.)

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