

# NATUROPATHIC TREATMENT OF ACUTE AND CHRONIC OTITIS MEDIA

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## ABSTRACT

This article reviews otitis media, currently the most common diagnosis in children, and discusses concerns regarding the standard medical treatment of antibiotics. By addressing the underlying causes of chronic otitis media such as allergies, nutritional deficiencies and compromised immune system, the practitioner can safely and effectively treat this condition. A basic treatment protocol based on naturopathic principles is presented, with variations to address the child's individual needs.

Since otitis media (OM) or inflammation of the middle ear is the number one reason for pediatric visits after well baby and child care (1), all practitioners should be aware of effective and safe treatments for this condition. Acute otitis media most often affects children between the ages of six months and three years, with an estimated 46% of all children having at least three acute ear infections by age three (2). Acute OM, whether with or without effusion (fluid in the middle ear behind the tympanic membrane), typically follows an upper respiratory infection and manifests with earache, fever, irritability and possibly hearing loss. If inflammation or excessive mucus production occurs in the eustachian tubes, proper drainage of this fluid becomes difficult. This is complicated by the fact that infants and children have shorter and more horizontal eustachian tubes than adults. If the effusion is clear with no apparent infectious agent associated with it, then it is referred to as serous, secretory or non-suppurative OM. If there is pus formation it is referred to as suppurative or purulent OM. The persistent swelling of the middle ear and presence of effusion that persists for three weeks to three months has been defined as subacute OM, with chronic OM persisting beyond three months.

Antibiotics are the number one conventional treatment of acute OM, accounting for 25% of all prescriptions for children under the age of 10 (3). However, recent research is questioning the appropriateness of such treatment. According to an article published in the *Journal of the American Medical Association* in 1991, children receiving amoxicillin for chronic serous OM may respond no better than those receiving placebos, and in addition, they may experience up to six times the rate of recurrence (4). The *British Medical Journal* published an international review of the scientific literature over the last 30 years on the value of antibiotics in treating acute OM. They found no compelling evidence that children with acute OM routinely given antimicrobials have a shorter duration of symptoms, fewer recurrences or better long term outcomes than those who did not receive them (5). A recent study comparing amoxicillin prophylaxis with placebo for children with recurrent acute OM discouraged routine use of amoxicillin prophylaxis (6). A meta-analysis from 33 randomized trials suggested that therapy for acute OM be guided by safety, affordability and tolerability versus theoretical effectiveness (7). These suggestions may be due to the fact that bacterial overgrowth is not linked to all cases of acute or chronic OM; in fact, in approximately 1/3 of the acute OM cases, ear cultures were found to be sterile with no causative organism detected (8). When children with chronic OM with various types of effusion were studied,

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it was found that the majority of the children had sterile fluid. In these cases, high concentrations of inflammatory mediators were detected, indicating their role in the pathogenesis of OM with effusion (9). Children with serous OM were evaluated in a Finnish study. After an asymptomatic period of several weeks a rhinovirus was isolated from middle ear fluid suggesting its role in this condition (10). In a similar study there was evidence that a respiratory virus infection was often present in patients with acute OM unresponsive to initial antimicrobial therapy, which may explain the prolongation of symptoms of infection (11). Other documented causes and contributing factors of otitis media include short duration of breast feeding, cigarette smoke exposure, early exposure to group day care, supine feeding position and bedtime bottle feeding (12). Other possible factors may include early introduction of solid foods (13), mineral and vitamin deficiencies (14) and essential fatty acid imbalances (15). What is apparent is that many so-called ear infections are indeed not bacterial infections at all.

This information should help reverse the trend of inappropriate and excessive use of antibiotics. Errant use of antibiotics can produce antibiotic-resistant bacteria and studies have reported increasing resistance to antimicrobial agents for the three most common bacterial causes of OM (*Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*) (16,17). Antibiotic use can also be damaging to the gastrointestinal tract by destroying normal intestinal flora leading to yeast overgrowth, inflammation of the intestines, and diarrhea (18).

After reviewing medical records of patients with a past history of serous or chronic otitis media, the author was struck by the similarities in the cases. Most of the children were breastfed for less than six months, if at all, and had solid foods introduced at six months of age or younger. All of the children ate some dairy, wheat and sugar from different sources and in varying amounts. The most typical sequence of events leading to acute OM was an upper respiratory infection with mucus production. All of the children were treated with antibiotics for their previous otitis media infections.

The author has found in over 13 years of experience that the most

effective treatment for acute and chronic OM is to support the child's immune system by avoiding allergenic and offending foods, and by providing immuno-supportive nutrients and herbs. The treatment protocol shown in Table 1 has been influential in effectively treating OM and is based on the philosophy of naturopathic medicine, the author's clinical experience and research findings.

Controlling food allergies is critical for treating recurrent serous OM. In one study, 104 children with recurrent ear infections were evaluated for food allergies by skin prick testing, IgE tests and food challenge. Eighty one children were found to have food allergies, most typically to milk and wheat. When the offending foods were removed from their diet for 16 weeks the ear problems improved significantly in 86% and returned in the majority of children when the foods were reintroduced (19). In another recent study done in Sweden, 97% of patients with serous OM had allergies as determined by using the radioallergosorbent test (RAST), IgE levels and skin tests (20). Nasal allergic inflammation has been shown to play a role in otitis media with effusion so the possibility of allergic sensitization must always be considered in patients with serous otitis media (21).

Based on this research and clinical experience, children with acute and chronic OM should avoid dairy products and reduce wheat. If it is not possible for the child to avoid dairy products completely, it is best to eliminate the ones that children tend to find most challenging. Typically these include cow's milk, cheese, and ice cream. Good substitutes are rice milk, soy milk, soy cheese or goat yogurt. Wheat substitutes may include spelt, rice, kamut, oats, corn or buckwheat for bread, pasta or whole grain options.

If a child is not responding to the typical protocol, or has other allergic symptoms such as hayfever, chronic nasal congestion, or eczema, it may be appropriate to consider eliminating the other common allergenic foods from the diet for 2-4 months. These include: eggs, corn, oranges, peanuts and soy products (22). Some parents may choose to do a blood test to evaluate for food allergies instead of the elimination diet. A common test being used today is the Elisa test

which measures IgE and IgG4 antibody levels. Other offending foods that compromise the immune system include various sugars found in many foods and even fruit juices in excess. The ingestion of 100 grams (three ounces) of sugar at one sitting significantly reduces the ability of neutrophils to engulf and destroy bacteria. That is, glucose, fructose, sucrose (table sugar), honey and even three glasses of orange juice, all depress the immune system. In contrast, the ingestion of 100 grams of starch (a complex carbohydrate) has no effect on immune function. Typically, at least a 40% reduction in neutrophil activity occurs two hours after ingestion which impairs the immune system (23,24). Even ingestion of only 75 grams (a bit over two ounces) of glucose has been shown to depress lymphocyte activity (25).

Practitioners should suggest less refined sweet treats such as those sweetened with fruit juice, stevia, rice syrup or honey to replace their current sweet treats. To help wean fruit juice out of the diet, begin by diluting the fruit juices 50/50 with water or with some pleasant tasting tea such as licorice, lemon balm, rosehips or chamomile.

Various nutrients and herbs are supportive of the immune system's normal function. Inclusion of these in the child's diet or as a supplement to the diet are critical for an effective treatment plan. Vitamin C's ability to stimulate the immune system includes enhancing the production of lymphocytes; enhancing the movement of lymphocytes to the needed area; and increasing interferon levels, antibody responses, antibody production, and the secretion of thymic hormones (26). Vitamin C has been shown to be antiviral (27) and antibacterial (28).

Supplementation with either Vitamin A or Beta carotene (which is a precursor to Vitamin A) has been shown to enhance numerous immune processes. Vitamin A has induced lymphocyte activity, phagocytosis and antibody production (29). Retinoids, found in vitamin A, have also been shown to be very effective in eliminating viral infections (30). Beta-carotene and associated carotenoids have been found to enhance the expression of peripheral blood monocyte surface molecules that are involved in initiating the immune response (31) and enhance T and B lymphocyte proliferative responses, respectively (32).

**TABLE 1**  
**BASIC TREATMENT PROTOCOL FOR ACUTE AND CHRONIC OTITIS MEDIA**

### 1) Foods to Avoid or Reduce

Avoid dairy products; reduce wheat, sweets, and fruit juices. If necessary, eliminate other suspicious allergens such as eggs, corn, oranges, peanuts and soy for two to four months and then rotate the allergenic foods every four to five days if the child has benefitted.

#### Suggestions:

Avoid cow's milk; substitute with rice or soy milk.  
Avoid cow's cheese; substitute with tofu products, goat cheese or possibly yogurt.  
Avoid ice cream; substitute with rice cream or tofu frozen dessert.  
Reduce wheat; substitute with spelt, rice, oat or kamut flours, rice cakes or crackers, buckwheat, rice or spelt pasta or quinoa, millet or amaranth cereal.  
Reduce refined white sugar; substitute with diluted fruit juice, stevia, honey or rice syrup.  
Dilute fruit juice 50/50 with water or pleasant tasting tea such as licorice, lemon balm, rosehips, or chamomile.

### 2) Foods to Emphasize

Eat foods rich in Vitamin C such as: red peppers, lemons, grapefruits, black currants, broccoll, cabbage, green peas, green onions, persimmons. Eat foods rich in Beta-carotene since it may be difficult to get children to eat Vitamin A rich foods such as liver. In addition they may not do well with other sources of Vitamin A such as milk, eggs and butter. Foods high in Beta-carotene are: apricots, carrots, kale, collards, sweet potatoes, pumpkin, winter squash, avocados, papaya, apples, cantaloupe, parsley, spinach.

### 3) Supplementation

Depending on the child's history consider supplementing the child's diet with the following nutrients for 3-16 weeks of the treatment protocol.

#### Vitamin C guidelines:

For immune support – 50 mg/day for 6-18 months old  
100 mg/day for 18 months-3 years old  
150 mg/day for 3-4 1/2 years old  
200 mg/day for 4 1/2-6 years old  
250 mg/day for 6-7 1/2 years old  
For acute ear infection – (age X 100) mg every two hours during infection

#### Vitamin A guidelines:

For immune support – 1000-2000 IU/day for 6-18 months old  
2000-2500 IU/day for 18 mo.-3 years old  
2500-3000 IU/day for 3-4 1/2 years old  
3000-4000 IU/day for 4 1/2-6 years old  
4000-4500 IU/day for 6-7 1/2 years old

For acute ear infection – (age X 10,000) IU/day with 50,000 IU maximum for up to two days in children under age 6, up to four days for children over age 6.

Vitamin A toxicity may be a concern for some parents, but recent data suggest that only levels of 100,000 - 500,000 IU/day can result in acute hypervitaminosis A. So even if the dosage is adjusted for the age of the child according to calculations indicated later in the article, the 10,000 - 50,000 IU/day maximum is well within safe limits.

#### Beta-carotene guidelines:

For immune support – 3,000 - 9,000 IU/day for 6-18 months old  
9,000 - 15,000 IU/day for 18 mo.-3 years old  
15,000 - 20,000 IU/day for 3-4 1/2 years old  
20,000 - 25,000 IU/day for 4 1/2-6 years old  
25,000 - 28,000 IU/day for 6-7 1/2 years old

For acute ear infection –  
(age X 20,000) IU/day up to 150,000-200,000 IU/day  
Beta-carotene is widely considered to be virtually nontoxic because

humans tolerate high doses without apparent harm. There is no evidence that conversion of beta-carotene to Vitamin A contributes to Vitamin A toxicity, even when beta-carotene is ingested in large amounts.

#### Zinc guidelines:

For immune support – 2-4 mg/day for 6-18 months old  
4-6 mg/day for 18 months-3 years old  
6-8 mg/day for 3-4 1/2 years old  
8-10 mg/day for 4 1/2-7 1/2 years old  
For acute ear infection – (age X 2.5) mg/day with 15 mg maximum

#### Echinacea spp.tincture or pill guidelines:

3-5 drops 2-3 X/day or 25-75 mg/day for 6-18 months old  
5-9 drops 2-3 X/day or 75-150 mg/day for 18 months-3 years  
9-12 drops 2-3 X/day or 150-200 mg/day for 3-4 1/2 years  
12-17 drops 2-3 X/day or 200-300 mg/day for 4 1/2-6 years  
17-25 drops 2-3 X/day or 300-400 mg/day for 6-7 1/2 years

For acute ear infection – same dosage every 2-3 hours during waking hours

*Larix occidentalis* powder - 1/2 tsp/day with or between meals for immune support or 1-2 tsp/day for an acute infection

Thymus extract or homeopathic preparation - (age X 50) mg/day of extract one dose three times/day of homeopathic preparation

### 4) Use a concentrated probiotic

Use a concentrated probiotic with at least 1.5 billion *Acidophilus* and 1.5 billion *Bifidus* per 1/2 tsp or capsule and suggest 1/4-1/2 tsp or 1/2-1 capsule one to two times/day

### 5) Add a source of essential fatty acids

Fatty Acids may include flaxseed, sunflower, sesame, pumpkin and or borage oil to diet using the following dosage according to age:  
1/2 tsp/day for 6 months-1 year  
1 tsp/day for 1-5 years  
2 tsp/day for 5-7 1/2 years of flax seed oil in food such as apple sauce, sweet potatoes, rice, cereal, or blended drinks. Flax seeds may also be ground up (1/2-1 TBL/50# weight) and used with cereal or cooked grains. Sesame, pumpkin, sunflower seeds and EFA fish such as Atlantic cod, mackerel, halibut, sea bass, haddock, albacore tuna, salmon, chinook, sardines, Atlantic herring, lake rainbow trout, and crappie are also other good dietary sources.

### 6) Treat acute infections aggressively

Use dosages of Vitamin C, A, Zinc, *Echinacea*, *Larix* or Thymus as indicated in #2 above. Also use Garlic, Mullein and St. John's Wort ear drops as needed – usually 3-4 drops at room temperature or slightly warmed in the indicated ear(s) two to four times/day during an acute infection. A hot wash cloth or hot water bottle may be helpful to reduce the pressure in the middle ear and promote fluid drainage.

**Note:** Dosages for children are generally calculated in two ways:

1. Young's Formula: Age in years / (Age+12) = portion of adult dose
2. Weight of the child: Adult dose X (Child's weight/150 pounds) = portion of the adult dose

Zinc deficient children suffer from more otitis media than children with normal zinc status. When trace mineral status was measured in 28 children ten months to ten years of age who were susceptible to otitis media, their levels of zinc were significantly lower than the 13 healthy controls (33). Zinc deficiency has been associated with many aspects of immune function such as decreased natural killer cell activity and decreased phagocytosis (34, 35).

*Echinacea spp's* immune enhancing properties result in enhanced cellular immune function (36) and increased macrophage phagocytosis and natural killer cell activity (37,38). *Larix occidentalis* has been found to be highly effective for recurrent otitis in children. The active ingredient is arabinogalactan, a polysaccharide similar to the one in *Echinacea spp*, which enhances natural killer cell cytotoxicity (39). The powder is slightly sweet and dissolves easily in liquid. Research has shown that thymus glandular extracts can decrease food allergies, improve immune function and improve resistance to chronic respiratory tract infections (40).

It is beneficial for the child to eat foods rich in vitamins C and A (or Beta Carotene) and for a period of time take supplements of vitamin A (or Beta Carotene), vitamin C and zinc to support the immune system. *Echinacea spp* (Purple coneflower), *Larix officinalis* (Larix) or thymus glandular may also be indicated.

Lactobacilli and Bifidobacteria, both health promoting intestinal bacteria, have been found to aid in digestion and stimulate the immune system (41). Some form of probiotic is helpful to re-establish the normal flora of the intestines which has been altered from the previous history of antibiotic use. There are dairy-free probiotic powders that are easy for children to take.

Proper levels of the essential fatty acids (EFA) play a critical role in decreasing inflammation. If linoleic acid, alpha-linolenic acid and arachidonic acid are present in balanced ratios, inflammation is typically self-regulated. However, when the middle ear fluid of children with acute and chronic OM was analyzed, this was not the case; leukotrienes, PGE2 and HPETE (all highly inflammatory substances) were found to be present (42). This could be interpreted as an imbalance with one

fatty acid predominating and stimulating the inflammatory cascade. A diet high in fish or supplemented with fish, flax seed or borage seed oil results in substantially less arachidonic acid in cell membranes, a lower level of the inflammatory chemicals and higher levels of anti-inflammatory chemicals (43). Therefore, in children with chronic OM, a usable form of essential fatty acid such as flax seed oil can be helpful to decrease inflammation. Since getting a child to take the oil regularly may be difficult, a more palatable flax seed oil is available. Some parents grind flax seeds and mix them with cereal or cooked grains. Sesame seeds, pumpkin seeds, sunflower seeds or cold-water fish would also be good to add to the diet as a source of essential fatty acids.

Another important aspect of treatment is to prevent acute OM from developing into chronic OM by use of some of the previously discussed therapies - Vitamin A (Beta-carotene), C, zinc, *Echinacea* and *Larix*. Other herbs may be considered for their antibacterial and antiviral properties. Studies have shown bacteria such as *E. Coli*, *Klebsiella* and *Proteus* to be inhibited by *Allium sativa* (garlic). The antimicrobial effects of garlic were found to compare favorably to commonly used antibiotics such as penicillin, streptomycin, chloramphenicol, erythromycin and tetracycline. These studies also demonstrated garlic's effectiveness in inhibiting the growth of some bacteria that had become resistant to one or more of the antibiotics (44,45).

*Verbascum thapsus* (mullein) flower extracts applied to the ear drum are believed to have a relaxing effect and according to folklore have been useful in treating OM. Derivatives of flavonoid glycosides in the flowers may have anti-inflammatory and antiviral effects.

*Hypericum perforatum* (St. John's Wort) has demonstrated antimicrobial activity *in vitro* against *Staphylococcus aureus*, *S. oxford*, *Streptococcus sanguis*, *S. mutans*, *Proteus vulgaris*, *Escherichia coli*, and *Pseudomonas aeruginosa* (46). *Hypericum* extracts have been found to exhibit antiviral activity in a variety of *in vitro* and *in vivo* studies (47), due to the presence of hypericin and pseudohypericin. The oil extract of *Hypericum* flowers also contains flavonoids that have dem-

onstrated pain-relieving and antimicrobial activity in a clinical setting.

Garlic ear drops have been used historically as an effective home remedy. Prepared herbal ear drops consisting of *Allium sativa*, *Verbascum thapsus* and *Hypericum perforatum* in a base of olive oil are now available and are very useful for resolution of acute OM.

Practitioners of naturopathic medicine have found that by comprehensively treating children with chronic otitis media they are able to not only treat the acute infection but by addressing the underlying causes, further ear infections can be prevented. In many cases the child's other health conditions improve, and as a result they are significantly healthier and in a better position to prevent future imbalances leading to other diseases.

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