Asthma

Excerpt from www.asthma.ca:

Doctors define asthma as a "chronic inflammatory disease of the airway" that causes the following symptoms:

- Shortness of breath
- Tightness in the chest
- Coughing
- Wheezing

Asthma has no set pattern. Its symptoms:

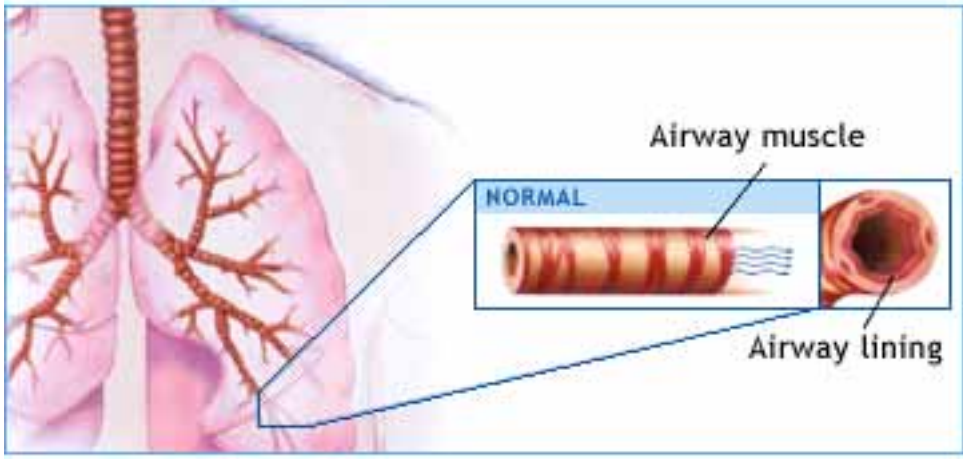
- Can be mild, moderate or severe
- Can vary from person to person
- Can flare up from time to time and then not appear for long periods
- Can vary from one episode to the next

The cause of asthma is not known, and currently there is no cure. However, there are many things you can do so you can live symptom-free.

Breathing: Normal Airway Versus Asthma Airway

Airway In someone with normal lung function, air is inhaled through the nose and mouth. It passes through the trachea (also called the windpipe) before moving into the bronchi (large airways), which are branching tubes leading away from the trachea. The bronchi branch into smaller and smaller tubes, ending in many small sacs called alveoli. It's in the alveoli that oxygen, which the body needs, is passed to the blood, while carbon dioxide, which the body doesn't, is removed from it.

Normal



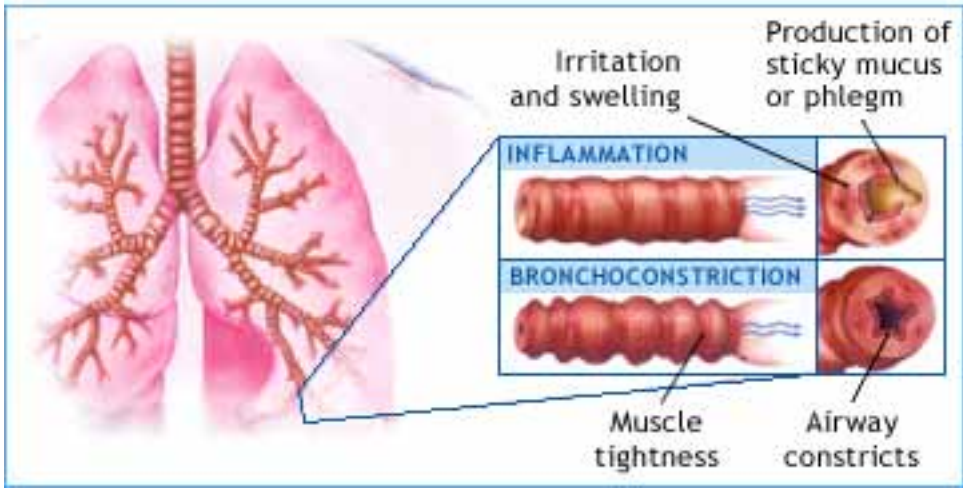
People with asthma often have trouble breathing when they're in the presence of what are called "triggers." When someone with asthma has asthma symptoms, it means that the flow of air is obstructed as it passes in and out of the lungs. This happens because of one or both of the following:

- The lining of the airways becomes inflamed (irritated, reddened and swollen), and may produce more mucous. The more inflammation the more sensitive the airway becomes, and the more symptoms.
- The muscles that surround the airways become sensitive and start to twitch and tighten, causing the airways to narrow. This usually occurs if the inflammation is not treated.

Both of these factors cause the airways to narrow, making it difficult for air to pass in and out of them.

The airways of someone with asthma are inflamed, to some degree, all the time. The more inflamed the airway the more sensitive the airway becomes. This leads to an increase in breathing difficulty.

Asthmatic



Asthma Can Affect Anyone Asthma is a chronic condition, meaning it needs to be monitored and controlled over a lifetime.

Anyone can get asthma, although it's usually first diagnosed in young people. Currently, about three million Canadians have asthma.

Living with Asthma Most people with asthma can live full, active lives. The trick is learning how to keep the asthma symptom-free. If you have asthma, you can control it:

- By avoiding your asthma triggers
- By taking your medication
- Through education from your healthcare team
- By following an asthma action plan

Title	**Acute and subacute bronchial effects of oral cannabinoids.**
Author(s)	**Gong H Jr, Tashkin DP, Simmons MS, Calvarese B, Shapiro BJ**
Journal, Volume, Issue	Clinical Pharmacology and Therapeutics 1984;35(1):26-32
Major outcome(s)	acute bronchodilator activity of delta 9-THC; no effect of cannabidiol; daily use of delta 9-THC not associated with tolerance
Indication	Asthma
Medication	Delta-9-THC
Route(s)	Oral
Dose(s)	20 mg THC daily; 1200 mg cannabidiol daily
Duration (days)	20 days
Participants	experienced marihuana smokers
Design	Open study
Type of publication	

Abstract

The bronchodilating activity of oral cannabinoids was evaluated in three double-blind experiments that involved the study of dose-response and interactive relationships and the potential development of tolerance. Data indicated that delta 8-tetrahydrocannabinol (delta 8-THC), cannabinol (CBN), and cannabidiol (CBD) in maximal doses of 75 mg, 1200 mg, and 1200 mg, respectively, did not induce significant dose-related physiologic effects in experienced marijuana smokers. delta 8-THC (75 mg) was, however, associated with bronchodilation, tachycardia, and peak highs less than that after delta 9- tetrahydrocannabinol (delta 9-THC). The combinations of CBN and CBD with low-dose delta 9-THC (5 mg) did not induce significant bronchodilation but did exert interactive effects on heart rate and "high." A 20-day study of daily delta 9-THC (20 mg), CBN (600 mg), and CBD (1200 mg) did not indicate tolerance or reverse tolerance to any drug. We conclude that delta 9-THC and, to a lesser extent, delta 8-THC, have acute bronchodilator activity but that CBN, CBD, and their combinations do not provide effective bronchodilation. The daily use of delta 9-THC was not associated with clinical tolerance.

Title	**Effects of smoked marijuana in experimentally induced asthma.**
Author(s)	**Tashkin DP, Shapiro BJ, Lee YE, Harper CE**
Journal, Volume, Issue	American Review of Respiratory Disease 1975;112(3):377-386
Major outcome(s)	after experimental induction of acute bronchospasm prompt correction of the bronchospasm with cannabis

Indication	Asthma
Medication	Cannabis
Route(s)	Inhalation
Dose(s)	smoked cannabis (2.0% THC)
Duration (days)	1
Participants	8 asthmatic subjects
Design	Controlled study
Type of publication	

Abstract

After experimental induction of acute bronchospasm in 8 subjects with clinically stable bronchial asthma, effects of 500 mg of smoked marijuana (2.0 per cent delta9-tetrahydrocannabinol) on specific airway conductance and thoracic gas volume were compared with those of 500 mg of smoked placebo marijuana (0.0 per cent delta9- tetrahydrocannabinol), 0.25 ml of aerosolized saline, and 0.25 ml of aerosolized isoproterenol (1,250 mug). Bronchospasm was induced on 4 separate occasions, by inhalation of methacholine and, on four other occasions, by exercise on a bicycle ergometer or treadmill. Methacholine and exercise caused average decreases in specific airway conductance of 40 to 55 per cent and 30 to 39 per cent, respectively, and average increases in thoracic gas volume of 35 to 43 per cent and 25 to 35 per cent, respectively. After methacholine-induced bronchospasm, placebo marijuana and saline inhalation produced minimal changes in specific airway conductance and thoracic gas volume, whereas 2.0 per cent marijuana and isoproterenol each caused a prompt correction of the bronchospasm and associated hyperinflation. After exercise-induced bronchospasm, placebo marijuana and saline were followed by gradual recovery during 30 to 60 min, whereas 2.0 per cent marijuana and isoproterenol caused an immediate reversal of exercise-induced asthma and hyperinflation.

Title	**Bronchodilator effect of delta1-tetrahydrocannabinol administered by aerosol of asthmatic patients.**
Author(s)	**Williams SJ, Hartley JP, Graham JD**
Journal, Volume, Issue	Thorax 1976;31(6):720-723
Major outcome(s)	significant broncholdilation with THC; faster action of salbutamol but both drugs equivalent at 1 hour
Indication	Asthma
Medication	Delta-9-THC
Route(s)	Inhalation
Dose(s)	200 micrograms in ethanol as aerosol
Duration (days)	1
Participants	10 astmatic subjects
Design	Controlled study
Type of publication	

Abstract

Ten volunteer inpatient asthmatics in a steady state were given a single inhalation of an aerosol (63 mul) delivered in random order, on each of three consecutive days, in the laboratory of a respiratory unit. Before, and for one hour after treatment the pulse, blood pressure (lying and standing), forced expiratory volume in 1 second (FEV1), forced vital capacity (FVC), peak flow rate (PFR), and self- rating mood scales (SRMS) were recorded. Treatments were placebo-ethanol only; delta1-tetrahydrocannabinol (THC) 200 mug in ethanol; or salbutamol 100 mug (Ventolin inhaler), administered double blind. Salbutamol and THC significantly improved ventilatory function. Maximal bronchodilatation was achieved more rapidly with salbutamol, but at 1 hour both drugs were equally effective. No cardiovascular or mood disturbance was detected, and plasma total cannabinoids at 15 minutes were undectable by radioimmunoassay. The mode of action of THC differs from that of sympathomimetic drugs, and it or a derivative may make a suitable adjuvant in the treatment of selected asthmatics.Ten volunteer inpatient asthmatics in a steady state were given a single inhalation of an aerosol (63 mul) delivered in random order, on each of three consecutive days, in the

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http://www.cannabis-med.org/studies/ww_en_db_study_show.php?s_id=60

Title	**Acute effects of smoked marijuana and oral delta9-tetrahydrocannabinol on specific airway conductance in asthmatic subjects.**
Author(s)	**Tashkin DP, Shapiro BJ, Frank IM.**
Journal, Volume, Issue	American Review for Respiratory Diseases. 1974 Apr;109(4):420-8.
Major outcome(s)	Smoked marijuana and oral THC caused significant bronchodilation of at least 2 hours duration.
Indication	Asthma
Medication	Cannabis;Delta-9-THC;Cannabidiol
Route(s)	Inhalation;Oral
Dose(s)	
Duration (days)	
Participants	10 subjects with stable bronchial asthma
Design	Controlled study
Type of publication	Medical journal

Abstract

The acute effects of smoked 2 per cent natural marijuana (7 mg per kg) and 15 mg of oral Delta-9-tetrahydrocannabinol (THC) on plethysmographically determined airway resistance (Raw) and specific airway conductance (SGaw) were compared with those of placebo in 10 subjects with stable bronchial asthma using a double-blind crossover technique. After smoked marijuana, SGaw increased immediately and remained significantly elevated (33 to 48 per cent above initial control values) for at least 2 hours, whereas SGaw did not change after placebo. The peak bronchodilator effect of 1,250 myg of isoproterenol was more pronounced than that of marijuana, but the effect of marijuana lasted longer. After ingestion of 15 mg of THC, SGaw was elevated significantly at 1 and 2 hours, and Raw was reduced significantly at 1 to 4 hours, whereas no changes were noted after placebo. These findings indicated that in the asthmatic subjects, both smoked marijuana and oral THC caused significant bronchodilation of at least 2 hours duration.

Title	**Bronchial effects of aerosolized delta 9-tetrahydrocannabinol in healthy and asthmatic subjects.**
Author(s)	**Tashkin DP, Reiss S, Shapiro BJ, Calvarese B, Olsen JL, Lodge JW.**
Journal, Volume, Issue	Am Rev Respir Dis. 1977 Jan;115(1):57-65.
Major outcome(s)	THC effective in healthy subjects and 3 asthmatic subjects; aerosol caused bronchoconstriction in 2 asthmatic subjects
Indication	Asthma
Medication	Delta-9-THC
Route(s)	Inhalation;Oral
Dose(s)	THC aerosol 5-20mg smoked THC 20mg oral THC 20 mg
Duration (days)	
Participants	5 asthmatic subjects, 11 healthy subjects
Design	Controlled study
Type of publication	Medical journal

Abstract

Effects on airway dynamics, heart rate, and the central nervous system of various doses of delta9-tetrahydrocannabinol administered in a random, double blind fashion using a Freon-propelled, metered-dose nebulizer were evaluated in 11 healthy men and 5 asthmatic subjects. Effects of aerosolized delta9-tetrahydrocannabinol were compared with aerosolized placebo and isoproterenol and with 20 mg of oral and smoked delta9-tetrahydrocannabinol. In the normal subjects, after 5 to 20 mg of aerosolized delta9-tetrahydrocannabinol, specific airway conductance increased immediately, reached a maximum (33 to 41 per cent increase) after 1 to 2 hours, and remained significantly greater than placebo values for 2 to 3 hours. The bronchodilator effect of aerosolized delta9-tetrahydrocannabinol was less than that of isoproterenol after 5 min, but significantly greater than that of isoproterenol after 1 to 3 hours. The magnitude of bronchodilatation after all doses of aerosolized delta9-tetrahydrocannabinol was comparable, but 5 mg of delta9-tetrahydrocannabinol caused a significantly smaller increase in heart rate and level of intoxication than the 20-mg dose. Smoked delta9-

tetrahydrocannabinol produced greater cardiac and intoxicating effects than either aerosolized or oral delta9-tetrahydrocannabinol. Side effects of aerosolized delta9-tetrahydrocannabinol included slight cough and/or chest discomfort in 3 of the 11 normal subjects. Aerosolized delta9-tetrahydrocannabinol caused significant bronchodilatation in 3 of 5 asthmatic subjects, but caused moderate to severe bronchoconstriction associated with cough and chest discomfort in the other 2. These findings indicate that aerosolized delat9-tetrahydrocannabinol, although capable of causing significant bronchodilatation with minimal systemic side effects, has a local irritating effect on the airways, which may make it unsuitable for therapeutic use.

http://www.cannabis-med.org/studies/ww_en_db_study_show.php?s_id=109