Should a sportsperson compete or train whilst suffering from an upper respiratory tract infection?

What should you advise a sportsperson with an upper respiratory tract infection concerning continued participation in strenuous exercise?

Practitioners are often faced with this problem in their consulting rooms. A sportsperson with a cold, influenza or another upper respiratory tract infection presents for treatment and/or advice as to whether they can compete or continue training.

There are often two agendas:

1. The doctor is concerned about the medical condition.
2. The athlete is concerned about his/her sporting performance.

The two participants in the consultation are probably asking the following questions:

The doctor's questions:

- What is the condition?
- How do I treat it?
- What are the dangers and complications if the sportsperson continues to exercise?
- What will the effect of the exercise be on the condition?
- What are the dangers of infecting others?
- Can this person safely continue to participate?

The sportsperson's questions:

- How soon will I be better?
- Can I compete/continue exercising?
- Will this affect my performance?

This article will try to answer these questions by looking at some relevant literature.

Let us first consider what we are talking about when we talk about upper respiratory tract infections.

For the purposes of this article we are really discussing "colds" and "flu". If one has secondary bacterial complications, such as sinusitis or pneumonia, then the disease will be more serious and the decisional dilemma about exercising to all intents disappears.

The following facts were obtained from The National Institute of Allergy and Infectious diseases:

The Common Cold

Sneezing, scratchy throat, runny nose—everyone knows the first signs of a cold, probably the most common illness known.

Children have about six to ten colds a year. In families with children in school, the number of colds per child can be as high as 12 a year. Adults average about two to four colds a year, although the range varies widely.

The Causes:

The Viruses. More than 200 different viruses are known to cause the symptoms of the common cold. Some, such as the rhinoviruses, seldom produce serious illnesses. Others, such as parainfluenza and respiratory syncytial virus, produce mild infections in adults but can precipitate severe lower respiratory infections in young children.

Rhinoviruses (from the Greek rhin, meaning "nose") cause an estimated 30 to 35 percent of all adult colds, and are most active in early autumn, spring and summer. More than 110 distinct rhinovirus types have been identified. These agents grow best at temperatures of 33 degrees Celsius, the temperature of the human nasal mucosa.

Coronaviruses are believed to cause a large percentage of all adult colds. They induce colds primarily in the winter and early spring. Of the more than 30 isolated strains, three or four infect humans. The importance of coronaviruses as causative agents is hard to assess because, unlike rhinoviruses, they are difficult to grow in the laboratory.

Approximately 10 to 15 percent of adult colds are caused by viruses also responsible for other, more severe illnesses: adenoviruses, coxsackie-viruses, echoviruses, orthomyxoviruses (including influenza A and B viruses), paramyxoviruses (including several parainfluenza viruses), respiratory syncytial virus and enteroviruses.

The causes of 30 to 50 percent of adult colds, presumed to be viral, remain unidentified.

Transmission:

Depending on the virus type, any or all of the following routes of transmission may be common:

- Touching infectious respiratory secretions on skin and on environmental surfaces and then touching the eyes or nose.
- Inhaling relatively large particles of respiratory secretions transported briefly in the air.
- Inhaling droplet nuclei: smaller infectious particles suspended in the air for long periods of time.

Research on rhinovirus transmission.

Much of the research on the transmission of the common cold has been done with rhinoviruses, which are shed in the highest concentration in nasal secretions. Studies suggest a person is most likely to transmit rhinoviruses in the second to fourth day of infection, when the amount of virus in nasal secretions is highest.

Flu

Influenza, or flu, is an acute respiratory infection caused by a variety of influenza viruses.

Influenza Viruses

The first flu virus was identified in the 1930's. Since then, scientists have classified flu viruses into types A, B, and C.

Type A is the most prevalent and is associated with the most serious epidemics. Type B outbreaks also can reach epidemic levels, but the disease it produces generally is milder than that caused by type A. Type C viruses, on the other hand, never have been connected with a large epidemic.

Transmission:

Viruses that cause flu spread primarily from person to person, especially by coughing and sneezing (via airborne droplets of respiratory fluids). Flu viruses can enter the body through the mucous membranes of the eyes, nose, or mouth. After a person has been infected with the virus, symptoms usually appear within 2 to 4 days. The infection is considered contagious for another 3 to 4 days after symptoms appear.

Symptoms

Flu is usually signalled by headache, chills, and dry cough, which are followed rapidly by body aches and fever. Typically, the fever starts declining on the second or third day of the illness. It is then that the upper respiratory symptoms become noticeable - nasal congestion and sore throat. Flu almost never causes gastrointestinal symptoms; the illness that people often call "stomach flu" is not influenza.

Complications

Flu complications (which can either accompany or follow the illness) generally result from bacterial infections in the lower respiratory tract. The ensuing pneumonia usually is caused by pneumococcal bacteria, but infections with staphylococci, streptococci, and *Haemophilus influenzae* type b can occur.

Symptoms of complications usually appear after the flu patient starts feeling better. This brief period of improvement is followed by the sudden onset of high fever, shaking chills, chest pain with each breath, and coughing that produces thick, yellow-greenish-coloured sputum.

Symptoms	*Cold*	*Flu*
Fever	Rare	Characteristic, high (38.8 - 40°C); lasts 3-4 days
Headache	Rare	Prominent
General Aches, Pains	Slight	Usual; often severe
Fatigue, Weakness	Quite Mild	Can last up to 2-3 weeks
Extreme Exhaustion	Never	Early and prominent
Stuffy Nose	Common	Sometimes
Sneezing	Usual	Sometimes
Sore Throat	Common	Sometimes
Chest Discomfort, Cough	Mild to Moderate; hacking cough	Common; can become severe
Complications	Sinus congestion or earache	Bronchitis, pneumonia; can be life-threatening

Table I: Is it a Cold or the Flu?

Now that we have refreshed our facts and are surer of the subject under discussion let us look at some of the known facts.

What do athletes believe?

Whilst many sports people may contend that upper respiratory tract infections impair their performances, in one study only 17.8% of college athletes reported missing practice because of illness and only 5.1% of them actually missed a competitive event because of an upper respiratory tract infection. [1]

Thus, our patients are exercising and participating whilst suffering from these illnesses

What is known about the effect of illness upon the physiology of the body?

Altered cardiac function. [2,3,4]

- Cardiac output and stroke volume may be decreased during systemic febrile viral illnesses.
- Oxygen uptake is increased, as is maximal heart rate during exercise, whilst suffering from febrile illnesses.
- Acute disturbances of myocardial electrical and mechanical function have been described in subjects with viral infections.

Altered Pulmonary function. [5,6,7]

The following have all been reported:

- Mild impairment of pulmonary gas exchange possibly as a result of bronchiolitis, resulting in mild ventilation-perfusion abnormalities.
- Rhinovirus infections have been shown to produce transient peripheral airway abnormalities, which are not serious.
- Another study on exercise whilst infected with a rhinovirus, showed no significant impairment of pulmonary function, maximum oxygen consumption, maximum heart rate or rating of perceived exertion. This suggests that the average cold does not impair these parameters of athletic performance

Effects on the muscular system. [8,9,10]

- Impaired skeletal muscle performance has been reported during viral infections. This has been a loss of strength, both isometric and dynamic, as well as endurance.

Other effects [11,12,13]

Viral infections, especially those with fever and gastroenteritis can result in:

- Reduced fluid intake and increased fluid losses.

Fluid deficits of as little as 2-3% of the body weight stress the circulatory system and can impair endurance.

- Body temperature normally rises during exercise but those with a fever who exercise experience an even greater rise in temperature.

Impaired fluid balance and temperature regulation put an athlete at greater risk of heat stress disease.

If an athlete/sportsperson takes medication for an upper respiratory tract infection, this may also be an added risk to producing a heat stress illness. Vasoconstrictors and anti-histamines affect the vascular system and fluid balance.

Summary:

Thus we can use as a valid argument, that to compete with an acute illness will not be in the competitor's best interest. Performance is almost certain to be affected negatively and thus the sportsperson is more likely not to do him or herself justice in individual competitions and is likely to be less effective to the team than usual.

Because of the physiological effects of the disease it is likely that fewer fitness gains will accrue than when exercising whilst healthy. It would seem prudent to have relative rest so that the body can recover more quickly, than to continue stressing an already stressed system.

Risk to others.

Training and competition involve heavy breathing, coughing and spitting. All of these acts, as well as the transfer of nasopharyngeal secretions by contact with infected areas, increase the likelihood of infection. Add to this the possibility of being more susceptible to infection after an intense exercise effort and the risk becomes additive. Athletes competing with others put their fellow competitors at risk of contracting the same disease they have.

Outbreaks of epidemic pleurodynia have been reported in soccer and football teams.[15] The usual pathogen in epidemic pleurodynia is a coxsackie B virus. The transmission of measles during sporting events has also been documented.[14]

Thus we have a duty to point out to sportspeople that they also need to consider not only their involvement but that of others as well.

The effect of exercise on the immune system. [17,18,19,20]

Shepard [16] reviews this extensively (56 references) in "The physician and Sports Medicine" for those who want to examine the detail.

Moderate exercise may reduce the risk of upper respiratory tract infections but intense training may increase that risk.

Intense exercise has been shown to suppress the immune system and leave the subject more susceptible to infection. Natural killer cell activity increases immediately after high-intensity exercise, but decreases after 1-2 hours after both moderate and high-intensity exercise. It is also not certain whether the effects of exercise on the immune system are clinically significant.

"Because of the physiological effects of the disease it is likely that fewer fitness gains will accrue than when exercising whilst healthy."

What are the dangers of exercise on the health of the sportsperson with a respiratory tract infection? [21,22,23,24,25]

Strenuous exercise may result in more severe symptoms especially in individuals with asthma or reactive airways. Strenuous exercise may lead to bronchospasm, increased wheezing, cough and dyspnoea. Enteroviruses such as coxsackieviruses usually cause respiratory or gastrointestinal symptoms. They have also been reported as a cause of myocarditis. Myocarditis has been implicated as a cause of death during exercise in humans and as the most frequent cause of sudden death in military recruits. Studies on mice with viral myocarditis

reported that strenuous exercise can result in myocardial necrosis and cardiac dilatation which can lead to death from pulmonary oedema. A recent report of sports related sudden death, found that 2 out of 34 subjects were found to have viral myocarditis at autopsy. Although myocarditis is relatively rare in humans, and the real risk of contracting this or developing it as a complication of a viral infection and exercise is impossible at this stage to determine, it seems prudent to advise sportspeople who have systemic disease to avoid strenuous exercise.

What then should we advise?

Armed with these facts you should have a better basis to advise your exercising patient. You can inform them comprehensively and point out the dangers.

Exercising when you have an upper respiratory tract infection **can:**

- Result in an exacerbation of symptoms
- Result in complications
- Can pose a risk for others
- Can impair performance.

It seems reasonable to advise that if an athlete has symptoms limited to the area ABOVE HIS / HER NECK **{The neck check-}**[20] i.e. Nasal congestion, rhinorrhoea and sore throat without fever, they can probably exercise with the proviso that if they experience any worsening of symptoms or difficulty breathing, excessive lassitude or muscle fatigue they must stop and not continue.

If they have BELOW THE NECK symptoms = systemic symptoms: myalgia, fever, hacking cough or chills they should be strongly advised to refrain from intense physical activity.

This obviously pertains to solo exercising. When it comes to participating with teams and others, the very real potential for infecting others must be stressed to the athlete or coach.

A final admonition may be for them to monitor their resting pulse rate and the effect of exercise on their pulse rate. If their resting pulse rate is significantly higher than normal, they should not participate in strenuous exercise. In any event they should not exercise at more than 60-70% of their maximum heart rate.

Patients end up deciding to follow our advice or reject it. If we inform sensibly then we have fulfilled our function. The rest is up to them!

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