Swimming and Asthma
Benefits and Deleterious Effects

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Summary

Swimming is a common pastime activity and competitive sport for patients with asthma. One reason for such popularity may be the low asthmogenicity of swimming compared with land-based activities. Review of available evidence suggests that swimming induces less severe bronchoconstriction than other sports. The mechanisms for this protective effect of swimming are not clear, but there is some experimental evidence intimating that it results in part from the high humidity of inspired air at water level, which reduces respiratory heat loss (and possibly osmolarity of airways mucus). Beneficial roles of horizontal posture and of water immersion have been tested but not confirmed. Swimming poses two potentially deleterious effects to the patient with asthma. One is the exaggerated parasympathetic tone due to the ‘diving reflex’, that has been shown to trigger bronchoconstriction. The other is airway irritation because of chlorine and its derivatives. Swimming as a training modality has definite benefits for the patient with asthma. These include an increase in aerobic fitness and a decrease in asthma morbidity. There is no conclusive evidence, however, that swim training causes a decrease in the severity or frequency of exercise-induced bronchoconstriction.
Swimming has long been considered a suitable sport for patients with asthma. In fact, swimming is one of the sports in which a patient with asthma can excel and reach top standards. An example, as reported by Fitch (1975), is that in each of the Olympic games from 1956 to 1972 there were gold medallists in swimming who had asthma. One reason is that swimming seems to induce less intense bronchoconstriction compared with other physical activities such as running, cycling or cross-country skiing. The reasons for the protective effect of swimming are not clear, but several mechanisms have been suggested.

This review first examines the evidence that swimming is less asthmogenic than other activities. This is followed by an analysis of possible mechanisms for the protection of the person with asthma against exercise-induced bronchoconstriction (EIB). We then discuss potentially deleterious effects of swimming other than EIB and end with an analysis of the beneficial effects of swimming as a training modality. 'Asthmogenicity' of a certain activity is defined here as the degree of EIB that typically results from this activity.

1. Low Asthmogenicity of Swimming

Fitch and Morton (1971) were the first to suggest that swimming induces a lesser decline in forced expiratory volume in 1 sec (FEV1) than cycling and running. 40 patients with asthma performed 8-min cycling, running and swimming tasks at 80 to 85% of their maximal heart rate (HR). Following cycling and running 92 and 90%, respectively, of the patients had a decrease (15% or more) in FEV1 compared with only 57% of the patients following swimming. Similar findings have been reported by Anderson (1972) in a comprehensive study and subsequently by several authors. A typical example of the airway response to running and swimming is shown in figure 1. Studies that have compared the asthmogenicity of swimming and other activities are summarised in table I. In 7 of the 8 studies, swimming induced less bronchoconstriction than cycling or running.

An important element in evaluating the studies...