

(OR) greater than 1.0 and a 95% confidence interval (CI) that did not overlap 1.0, included diabetes (OR = 3.3, 95% CI 1.3–8.1) and smoking cigarettes within the previous 6 months (OR = 2.4, 95% CI 1.1–5.4). The administration of oral antifungal therapy decreased the OR of acquiring severe pulmonary CM to 0.3 (95% CI 0.1–0.5). Risk factors for developing disseminated CM were black race (OR = 4.6, 95% CI 1.4–15) and having an annual income of less than \$15 000 (OR = 2.4, 95% CI 1.1–5.7).

The results of this study agree in large part with data published by the Centers for Disease Control and Prevention (CDC). The major limitation of this study is that only 56% of the cases that met inclusion criteria were enrolled. Nevertheless, the data are valuable. According to the CDC Web site, risk factors for disseminated CM include immunosuppression, being black or Filipino, and pregnancy. There are no specific risk factors cited for severe pulmonary CM. In this study, there were too few people of Asian descent and too few people with immunosuppression to be statistically significant. Of course, much of the CDC data comes from previous studies from Kern County, so it is not surprising that the results are consistent. Ideally, physicians can use all of these data to better identify who is at risk for complications from CM. Through both primary and secondary prevention, morbidity and mortality could be decreased. Finally, if randomized controlled trials could confirm the suggested effect of early antifungal therapy, we would have another weapon against this disease.

(*Clin Infect Dis.* 2001;32:708–714) N. E. Rosenstein, K. W. Emery, S. B. Werner, et al.

INTERNATIONAL JOURNAL OF SPORTS MEDICINE

Respiratory effects of a single dive to 50 meters in sport divers with asymptomatic respiratory atopy

The threat of bronchoconstriction prevents severe asthmatics from scuba diving, but it is unknown whether individuals with asymptomatic respiratory atopy are safe to dive. Thus far, there is no definitive evidence demonstrating that individuals with asymptomatic respiratory atopy are at risk while scuba diving. As scuba diving becomes more popular, this issue will likely affect more people. The authors of this study evaluate the effects of a single wet dive on the pulmonary function of 9 sport divers with asymptomatic respiratory atopy.

The subjects were confirmed as having asymptomatic respiratory atopy if they had a positive skin prick reaction to at least one common airborne antigen but did not experience wheezing or use bronchodilators on a regular basis. Nine healthy sport divers of similar age, height, and weight were chosen as control subjects. All subjects wore wet suits and full scuba gear. Each spent 15 minutes at a depth of 50 m in the wet compartment of a hyperbaric chamber in Germany. Timed decompression stops were made during ascent, so that the total

of each dive was 32 minutes. The water temperature was held at 24°C. Pulmonary function tests were performed before the dive, 3 hours after the dive, and 24 hours after the dive. Parameters measured were specific airway conductance, forced vital capacity, forced expiratory volume in 1 second, minimum expiratory flow at 50% of vital capacity, hemoglobin concentration, and transfer factor of the lung for carbon monoxide. Methacholine challenges were performed 4 weeks after the dive.

Results showed no significant differences in pulmonary function before the dive. After the dive, only airway conductance was significantly different between the groups. Three hours after the dive, conductance increased to 14% above baseline in the group with respiratory atopy. Twenty-four hours after the dive, conductance fell to 15% below baseline in this group. Methacholine challenges at follow-up were normal. In their discussion, the authors state that the changes in airway conductance might represent a bronchoconstrictive response. In the control group, airway conductance did not change with time. The authors speculate that these results could indicate that individuals with respiratory atopy are more susceptible to the hazards of diving than the normal population. On the other hand, since no other measure of pulmonary function changed, including expiratory flow, the authors note that their results might not be clinically significant.

The key feature of this study is that the subjects actually performed a wet dive wearing full gear. According to the authors, this is the first study of its kind. At the same time, however, the size of the study group was very small. Larger numbers might be needed to detect subtle differences between groups. Furthermore, it is not known if the lungs of individuals with asymptomatic respiratory atopy would respond in the same manner if dives were performed at various times of the year, when different airborne antigens might be higher in concentration. A larger, longer term study will be needed to determine whether the results of this study have any clinical significance.

(*Int J Sports Med.* 2001;22:85–89) K. Tetzlaff, C. M. Staschen, N. Struck, and T. S. Mutzbauer.

MEDICINE & SCIENCE IN SPORTS AND EXERCISE

Stretching at the ankle joint: viscoelastic responses to holds and continuous passive motion

To the sports enthusiast, a sprained ankle means waiting 4 to 6 weeks before returning to full activity. To the emergency physician, it means a potential radiograph, RICE (rest, ice, compression, elevation), and discharge. Neither patients nor physicians are usually very alarmed by ankle sprains, yet there can be significant long-term morbidity from severe sprains. Moreover, millions of health care dollars are spent each year in treating this common injury. Better methods of prevention

and shorter rehabilitation times could have a great impact, and proper stretching might be the key. The authors of this study have objectively analyzed how the ankle responds to different types of stretching.

Twenty-four men and women (mean age 26 years) who were currently involved in recreational and/or competitive sports for at least 1 to 2 hours, 3 to 4 times per week participated in the study. All subjects were reported to be healthy, and none were engaged in "formal" stretching programs. Four groups were formed in order to test 4 types of stretching programs. The 4 programs were a continuous hold for 60 seconds, 2 sequential holds for 30 seconds each, 4 sequential holds for 15 seconds each, and continuous passive motion for 60 seconds. Specially designed equipment moved the subjects' ankles through 1 of the 4 programs. A "hold" was defined as dorsiflexion at 80% of each person's maximum range of motion. Each person had 60 seconds of stretching per day for 1 week in each of the 4 groups.

Sensors within the equipment measured stiffness and force relaxation. "Stiffness" was defined as resistance to movement, while "force relaxation" referred to the tension of the muscles of dorsiflexion at any given position. According to the results, only continuous passive motion significantly reduced stiffness ($P < .05$), as measured over the first 10% and last 10% of motion. Muscle tension was found to be most reduced by holds. Continuous motion reduced tension by an average of 10.5%, whereas holds decreased tension by 19% to 21.7%, with the greatest decreases in the first 20 seconds of a hold or series of holds.

The authors of this study propose that these results have ramifications for both injury prevention and rehabilitation. They conclude that one should perform holds to decrease peak forces, and that one should perform continuous motion to decrease stiffness. As with all bench research, however, there are several caveats in applying study results to real life. First, the internal validity of the study itself must be solid. In this study, it must be noted that stiffness was reported only at the 30-second point of each program, and not at all during the 60-second hold. Consequently, one must ask if significant differences in stiffness might have been seen after all four 15-second holds, after both 30-second holds, or at the end of the 60-second hold. Secondly, laboratory conditions must simulate real life. This study assessed how the ankles and legs of healthy athletes respond to stretching. It cannot be inferred that this applies to people in all degrees of physical condition. Nor can one postulate that the viscoelastic properties of injured ankles are the same as those in this study, thus giving this study little applicability for rehabilitation. It seems that the most valuable finding that this study provides is that both holds and continuous motion change the biomechanics of the ankle in healthy athletes. The ramifications of these findings have yet to be determined.

(*Med Sci Sports Exerc.* 2001;33:354–357) P. J. McNair, E. W. Dombroski, D. J. Hewson, and S. N. Stanley.

NEW ENGLAND JOURNAL OF MEDICINE

La Crosse encephalitis in children

Most cases of La Crosse (LAC) encephalitis are undiagnosed. Not only have confirmatory tests been insensitive and expensive, but there have been no specific treatments proven to affect outcome. Furthermore, most patients with this mosquito-borne virus suffer little more than cold symptoms. At the same time, however, not everyone with LAC encephalitis has a benign outcome. Also, some treatments are being developed. This recent article, published in the *New England Journal of Medicine*, provides an updated description of LAC encephalitis and attempts to identify risk factors for developing severe disease. It also discusses some of the potential treatments available.

The authors of this study performed a retrospective chart review of 127 children who were diagnosed with LAC encephalitis in Charleston, WV, between 1987 and 1996. Multiple statistical calculations were performed, including univariate analyses. They provide both epidemiological data and clinical data on all 127 children.

The mean age of patients in this study (\pm SD) was 7.8 ± 3.5 years, and most cases were diagnosed between July and September. The most common symptoms on presentation were headache, fever, vomiting, mental status changes, and seizures. Although patients who suffered clinical deterioration more often had fevers, vomiting, and seizures, the sensitivity and specificity of these symptoms were too low to be of clinical value. Patients with in-hospital deterioration did, however, have statistically significant lower sodium levels and higher fevers than those with benign outcomes. They also tended to have Glasgow Coma Scores less than 13. Laboratory and radiographic findings were nonspecific. Some patients were given ribavirin therapy, but the results of this therapy will be part of another clinical report.

Not all children recover from LAC encephalitis free of long-term sequelae. In this study, 15 children (12%) had neurological deficits at discharge. Of the children aged 5 years and older, 28 (32%) were classified as having relatively severe disease. Cognitive testing of these children 10 to 18 months after hospitalization revealed consistently lower IQ scores than average. No proven treatment is available for LAC encephalitis, but new drugs are being tested. Also, antibody screens can more accurately diagnose LAC encephalitis than in the past. Currently, most children are misdiagnosed and are given unnecessary, ineffective antibiotics. Correctly diagnosing LAC encephalitis and recognizing potential markers of clinical deterioration should enable physicians to better treat these children and reduce morbidity.

(*N Engl J Med.* 2001;344:801–807) J. E. McJunkin, E. C. De Los Reyes, J. E. Irazuzta, et al.

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