

# Athletes Resuming Activity After Infectious Mononucleosis

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## QUESTION

How soon can an athlete return to sports after infectious mononucleosis (IM)?

## SOLUTION

### SEARCH STRATEGY

Information was obtained using MEDLINE, keywords: “infectious mononucleosis,” exploded (MeSH), combined with “sports,” exploded (MeSH); and SPORTDiscus, keywords: “infectious mononucleosis” (mp). Additional articles were obtained from the reference list that follows.

### BACKGROUND

Infectious mononucleosis is caused by the Epstein-Barr virus, a member of the family Herpesviridae, and is a commonly diagnosed infection in the United States, with 25 to 50 cases occurring per 100 000 persons annually.<sup>1</sup> Two studies estimated the peak incidence to occur between 15 to 19 years of age, with 345 to 671 cases per 100 000 persons per year.<sup>2</sup> Others report that 1% to 3% of college students become infected per school year.<sup>3</sup> Because the incubation period is 30 to 50 days, controlling the spread of the disease can be difficult, especially in school populations. Athletes in the affected age group are of particular concern, because physicians are often pressured by parents, coaches, and patients to allow athletes to resume athletic participation and competition sooner than would be advisable. Allowing athletes to return to competition prematurely puts them at a potentially fatal risk for splenic rupture, which is estimated to occur in 0.1% of all cases of IM.<sup>4</sup>

There are no controlled clinical trials on which physicians can base such a decision, because it would be unethical and possibly fatal to allow study patients to

resume activity at varying times. Furthermore, the guideline distributed in a preparticipation examination monograph endorsed by several medical organizations simply states “an athlete who has acute splenomegaly should not participate in sports.”<sup>5</sup> However, this does not specify clinical guidelines that physicians can follow to determine when a patient can safely return to athletics, and raises the question “should every athlete recovering from IM have a radiographic evaluation before returning to activity?” Aside from this “guideline,” only case reports and case series are available to help guide physicians.

Though primarily a benign disease, IM can cause neurologic, respiratory, hematologic, and cardiovascular complications, as well as additional infections. While most reports cite approximately 4 weeks for lymphocytosis and liver chemistry test results to return to normal, no studies have established the usefulness of laboratory markers to gauge the appropriate length of time before a patient can return to athletics.<sup>4</sup> Hepatic and splenic enlargements have been well documented, and studies have found that rupture of the spleen ranks with airway obstruction as the most common potentially fatal complication of IM.<sup>6</sup> However, other issues are also important in deciding when an individual can return to athletic competition and activity. After any type of viral illness, an athlete’s strength and endurance decreases from baseline, and in those with a febrile illness,  $\dot{V}O_2$ max declines. Furthermore, any athlete with abdominal pain or other clinical concerns, including markedly abnormal initial laboratory results, should be evaluated further before returning to play. However, the timing of return to activity after IM primarily concerns the prevention of splenic rupture.

A review by Maki and Reich<sup>7</sup> included 55 cases of splenic rupture in athletes with IM. Almost all of the cases occurred between days 4 to 21 of illness and all spleens were enlarged 2 to 3 times the normal size (250-500 g). Johnson et al<sup>8</sup> reported 2 of 3 cases of spontaneous splenic rupture occurring between 4 and 7 weeks from onset of symptoms. A case series of 22 traumatic splenic rup-

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tures in athletes was reported by Frelinger,<sup>9</sup> with 17 cases (77%) related to participation in football, and 36% of the cases related to confirmed IM. While physicians typically limit athletes out of fear that collision or contact causes rupture, more than half of the 55 cases reported by Maki and Reich were atraumatic. Whether “spontaneous” or traumatic, splenic rupture is still an uncommon event. In a 40-year retrospective analysis of 8116 patients with IM being treated at the Mayo clinic, Farley et al<sup>1</sup> found only 5 substantiated and 4 potential cases of atraumatic splenic rupture. The incidence of nontraumatic splenic rupture varies in different reports, but it can be estimated that the incidence in IM patients is 0.1%.<sup>7</sup>

Though the exact mechanism for spontaneous rupture remains hypothetical, enlargement of and pathologic changes to the spleen occur approximately 2 weeks after the onset of IM.<sup>10</sup> With lymphocytic infiltration, the normal tissue anatomy, including support structures, is distorted and fragility of the spleen increases. No reports delineate how long these changes continue.

If the clinician could detect splenomegaly by physical examination and not allow return to athletics until resolution of the condition, concerns about the patient resuming athletic participation would be alleviated. However, in a study by Dommerby et al,<sup>11</sup> 29 patients had splenomegaly (length, 12.5-15.5 cm) documented by ultrasound (normal length, <12 cm), but in only 17% was the spleen palpable. Many athletes have well-developed abdominal musculature, which makes palpation for splenomegaly even more difficult. One potential concern is the rare incidence of splenic rupture being caused by deep palpation during examination.<sup>1</sup>

Since 50% of patients with IM have splenomegaly,<sup>3</sup> and physical examination does not always recognize the condition, many authors advocate using radiographic means to confirm splenomegaly.<sup>3,12,13</sup> Diagnostic methods such as radionuclide scan, computerized axial tomography, and ultrasonography can all establish spleen size and volume.<sup>13</sup> Maximum values for length (12 cm), width (7 cm), and volume (250 cm<sup>3</sup>) have been presented as guidelines for radionuclide and computed tomographic scans, while the guideline for diagnosing splenomegaly by ultrasound is a cephalocaudal diameter of 13 cm or more.<sup>14</sup> However, 3% of 2200 healthy college students were found to have palpable spleens on physical examination, and if these more sensitive tests are used, some athletes may be unnecessarily excluded from competition.<sup>15</sup> Those athletes with persistent splenomegaly should be considered on a case-by-case basis.<sup>7</sup>

Opinions on safe return to athletic activity vary. Oski<sup>16</sup> advocates a 3-week hiatus, with return to contact sports if the spleen is not palpable. Eichner<sup>12</sup> suggests easy training if the patient is asymptomatic 3 to 4 weeks after the onset of illness, and return to contact sports 5 to 6 weeks from the onset of illness if the spleen is of normal size. Rut-

kow<sup>17</sup> prescribes a 6-month restriction from activity (but gives no case for increased risk of rupture beyond 4 weeks). Sevier<sup>3</sup> recommends noninvasive imaging to assess splenomegaly at 3 weeks. If the test is negative and the patient is asymptomatic, 50% submaximal conditioning for 1 week is recommended, and if that is tolerated well, the patient can fully return to activity. If splenomegaly is present, another imaging study should be done in 1 week, or after 5 weeks from the onset of illness the patient can be permitted to return to limited activity.

## BOTTOM LINE

No specific studies or guidelines have established the exact timing of safe return to athletic participation after IM without risk of splenic rupture. Since rupture can occur with minimal to no trauma, a pragmatic approach precluding strenuous activity, including weightlifting and contact sports at least during the first 3 to 4 weeks from the onset of illness, seems prudent. If the athlete is returning to a high-risk, contact, or collision sport at that time, radiologic evaluation of spleen size may be reasonable before clearance. The use of imaging studies before return remains a debated issue and further research in this area is needed before making it a requirement.

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