LETTER TO THE EDITOR

Harmful effects to healthy young people who stayed at home due to school closures caused by COVID-19: damage to bones resulting from resumption of exercise after restarting school

Dear Editor,

The need for exercise has been emphasised in both young and old patients with rheumatic diseases [1–3]. However, the same thing obviously applies to healthy young people if they do not exercise for a long time. Bram JT and colleagues report that public health measures to encourage social distancing have been implemented, including cancellation of school and organised sports during the COVID-19 pandemic, and a resulting change in paediatric fracture epidemiology is expected [4]. This raises a very important issue.

The COVID-19 pandemic currently represents the greatest global public health crisis. To date, no effective treatments have been established. Although COVID-19 has subsided in some regions, it remains globally prevalent, with second and third waves expected. Therefore, development of therapeutic drugs and vaccines is urgently needed. Remdesivir has potent in vitro activity against COVID-19 [5]. In addition, other compounds are being investigated for their suitability as therapeutic agents in patients with COVID-19. However, data collection and analysis regarding the efficacy and safety of these drugs has been problematic, and some papers about potential COVID-19 therapies have been withdrawn from top-tier journals, even after publication, further contributing to the confusion [6,7].

In the absence of any pharmaceutical intervention, the only strategy against COVID-19 is to reduce intermingling of susceptible and infectious people through early ascertainment of cases or reduction of contact [8]. Therefore, social distancing interventions and staying at home have been adopted as solutions in many countries.

In response to the COVID-19 pandemic, 107 countries had implemented national school closures by 18 March 2020 [9]. It is unknown whether these school-closure measures have been effective in preventing coronavirus outbreaks. Unfortunately, no data regarding the relative contribution of school closures to transmission control are currently available [9]. Policymakers need to be aware of equivocal evidence when considering school closures for COVID-19, and that combinations of social distancing measures should be considered. Therefore, social distancing interventions in schools require further consideration if restrictive social distancing policies are implemented for long periods. Herein, we report a phenomenon that appears to be a harmful effect of closing schools.

On 3 March 2020, at the request of the prime minister, temporary school closures began throughout Japan. These temporary closures were to be suspended on 24 May 2020, although they were interrupted for a few days. Targets of the school closure included elementary schools, junior high schools, and high schools.

Our medical facility is located in Shizuoka City, which is divided into three administrative districts. One of these districts, the Shimizu Ward, has a population of 230,000 people. Shimizu Ward is reported to have about 10,000 elementary school students and 15,000 junior high school students, and it has seven high schools. In this ward, there are 23 medical facilities with orthopaedic clinics.

Recently, 2 junior high and 2 high school students (age, 13–16 years; all males) were treated at our facility for bone trauma after remaining at home for about 3 months due to school closures. They spent most of their time at home and rarely went out for 3 months.

They are all naturally healthy and have no previous history of special illnesses. Before staying at home, they used to exercise and had regular physical education classes and club activities. After schools opened on 24 May, the schools resumed classes, including physical education. All 4 students gradually began to experience pain in their knee joints about 1 or 2 weeks after resuming physical education, and eventually could not endure the pain, so they visited our facility. According to their and their teacher’s testimonies, many other students who did not actually visit a physician complained of pain in the lower limbs, such as knee joints, and weakness in muscles of the upper and lower limbs after resuming physical education activities.

All 4 boys had normal diagnoses according to plain X-ray, but were diagnosed with bone bruises by MRI (Figure 1).

MRI findings of Case 1 showed abnormalities in the signal region on the medial side of the proximal tibia and Case 2 showed abnormalities on the medial side of the distal femur and medial side of the tibia. Since the pain was very strong in both cases, we applied casts and recommended crutches without loading. Both cases were changed to braces and started loading in about two weeks, returning to their normal lives in four weeks. Case 3 was admitted to the hospital because he felt right knee pain while jumping in a physical education class. His pain was mild despite the presence of a bruise evident on MRI, so he was treating only by
bracing. Case 4 was the most severe case. He injured his right knee while playing table tennis during club activities. MRI findings showed fracture lines, so a cast was worn for three weeks and then he was switched to braces. Fracture lines, which could not be confirmed by plain X-ray at the initial examination, were fused after two months, and the symptoms have completely disappeared (Supplement).

In particular, teenage children, who are still in their growth stage, may start to exercise and suddenly apply a load to the knee or other joints, resulting in bone bruises that may lead to fatigue fracture. If the patient complains of strong pain, it is necessary to consider MRI even if there is no bone fracture on plain X-ray. In these cases, the knees were all fixed with a cast or brace, and patients used crutches to reduce the loading on their knees.

It is expected that second and third waves of the pandemic will occur, necessitating stay-at-home orders and school closures once again. To avoid cases such as those described herein, it may be necessary to recommend exercise at home or exercise without contact with other people.

The limitation of this report is that because it reflects the experience of only one institution, it is unclear at what rate such events have occurred on a larger scale. In addition, a high possibility exists that such events will be overlooked by plain X-ray alone, since bone bruises cannot be diagnosed without using MRI. Furthermore, it is unclear how long a person must stay at home to cause damage to the body after resuming exercise.

Regardless, it may be necessary to reconsider the importance of physical fitness while staying at home, which is required as a part of social distancing interventions, during future virus infection waves, with reference to the present cases. These observations will, of course, also apply to patients with rheumatic diseases.

The authors have written permission from all patients and their families to report cases in this paper.

Conflict of interest
None.

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