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Clinical case

Use of the fatigue questionnaire (QFES) in child athletes for individual follow-up: two cases

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Abstract

Background. – Fatigue is one of the multiple components of the life of an athlete. It may have adverse consequences on the health of child athletes in particular in the short or long term. For the trainer or medical staff, detecting fatigue as fast as possible is therefore advisable.

Observations. – Two young skiers beginning a sports class at age 11 were followed for 3 years within the framework of their practice for sport competition (1 alpine and 1 cross-country skier). At the same time as medical follow-up organized within the sports classes of the school they attended, the children completed at six times a questionnaire about fatigue, the QFES, (in French: *Questionnaire de fatigue de l'enfant sportif*). At one precise time during this follow-up, the QFES score for each child, both at age 12, clearly increased, by 175% and 133.3%, respectively, from previous scores. A thorough analysis of data gathered by the QFES allowed for revealing particular parameters of the fatigue: decreased sports performance, difficulties in relations and sleep disorders.

Conclusions. – Systematic use of the QFES in parallel with medical consultations for children participating in sport may be an efficient tool to detect the early appearance of fatigue and may therefore be integrated in preventive guidance to protect children in sports practice.

Keywords: Sports children; Individual follow-up; Questionnaire about fatigue

1. Introduction

Fatigue in children who participate in sports is a response to an imbalance between training and recovery. It can be defined as pathological if it continues after a rest period and it induces decreased training capacity, accompanied by decreased performance.

Fatigue is a more or less well-expressed multifactorial symptom and should be identified as quickly as possible in children in competitive sports who are subjected to specific constraints of training (volume, conditions and particular structure of practise).

In child athletes, one can easily refer to fatigue or unfitness but not overtraining because of the lack of research in this field. The concept of 'fatigue' is, however, rather vague, and two levels of fatigue exist: central and peripheral [7]. Central-level fatigue is characterized by dysfunction in the central nervous system. It is expressed by decreased nerve command of the motor function, beginning at the cortex and then altered in the first spinal levels of motor function and the alpha motoneurons. Central fatigue involves numerous neuromediators (i.e. GABA, glutamate, and serotonin) and influences, in turn, physical and psychological behaviors such as loss of coordination, ataxia, and devolution [6]. Peripheral fatigue is muscular and is shown by a change in functioning of skeletal muscles. Bongbele [2] clarifies that muscular fatigue is thus 'the expression of an incapacity to generate a strength, to maintain it, and/or the incapacity for a muscle to maintain a required or expected strength.'

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Following a joint request by the French Society of Sports Medicine and French Society of Pediatrics, we elaborated and validated a questionnaire about fatigue for child athletes, the QFES (in French: Questionnaire de Fatigue de l'Enfant Sportif)., which allows for quick detection of fatigue and is specific to children aged 9 to 15 years [3,4], this questionnaire is available on: www.sciencedirect.com. In clinical practice, the signs of fatigue can be evaluated with certain precision, but the evaluation is expensive and lengthy, and for children, blood and/or clinical examinations are often invasive. Questionnaires about fatigue can be fast, practical and accessible tools for use by physicians and even trainers for children. The QFES was developed to collect data and, with the medical history of child athletes, it allowed to determine origin of fatigue. The QFES is administered over one prolonged period and during targeted key moments of the sport season to obtain a profile of 'physical form' for each child athlete. With this follow-up, we can quickly identify a state of unfitness with a QFES score higher than 45/120, the threshold beyond which the fatigue must be monitored, which was determined from a first study of 289 child athletes to validate the QFES [3]. The fatigue score is calculated by summing the scores of 30 items evaluated by the child on a 5-point Likert scale. The 30 items represent seven dimensions characterizing fatigue (for details, see [3]). In this first work, the questionnaire was evaluated for reliability, sensibility and specificity [3].

From this study, we selected two cases of child athletes who showed high QFES scores at one point in time to show the use of the questionnaire in evaluating fatigue (Fig. 1).

2. Observations

2.1. Subject 1

A 12-year-old boy practicing alpine skiing at an inter-regional level enrolled in a college with a sports class had the following 3-part sports practise (Table 1):

- ski training (or physical preparation not on snow);
- climbing as leisure activity;
- sports in at framework, for approximately 15 h of sports per week.

At the beginning of the study, the child was 151 cm tall and 37 kg and at the end, 165 cm tall and 48 kg, with a gain of 8 cm and 7 kg, respectively, in 1 year. At the end of the second sports season, a QFES score of 42, close to the threshold of 45, was obtained. At this time, patella syndrome was diagnosed, and the child complained about frequent colds, gastrointestinal

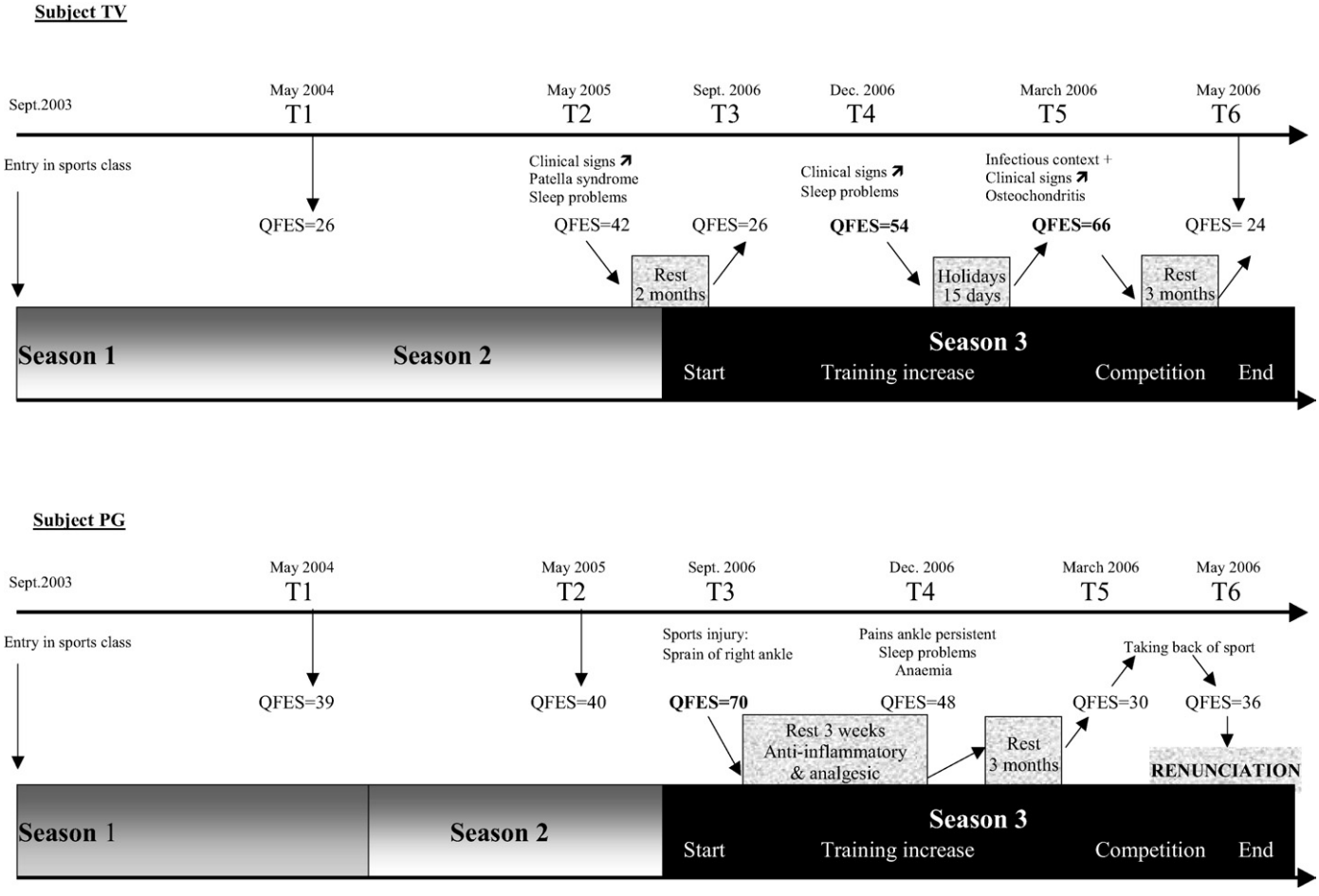

Fig. 1. Chronology of the follow-up of two cases of child athletes over 3 years.