

PREVENTION OF FINGER GROWTH-PLATE INJURIES IN YOUNG COMPETITIVE CLIMBERS

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Abstract

Epiphyseal stress fractures of the finger's second phalanx are predominant in young climbers. The objectives of the study were 1- to determine the incidence of these injuries among young French competitive climbers; 2- to determine injury risk factors during training. A questionnaire was sent to French climbing coaches. Four injured climbers presenting five injuries were collected. The injured seemed to train more than the non-injured, to have a higher level of competition and to compete more each year. In global physical preparation, the injured seemed to work less on their flexibility than the uninjured. The injured paid less attention to warm-up and were doing less cardiorespiratory warm-up. The training of injured climbers had known risk factors of overuse injuries and epiphyseal fractures. There was a lack of knowledge among youth and coaches about: (1) the use of methods at risk; (2) epiphyseal stress fractures of the fingers and their consequences. To prevent these fractures, trainings and competitions should be adapted to children and an information campaign should be organized.

Keywords: climbing, child, epiphyseal stress fracture

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Résumé :

Les fractures de stress épiphysaires de la 2^{ème} phalange des doigts sont majoritaires chez les jeunes grimpeurs. Les objectifs de l'étude étaient 1- déterminer l'incidence de ces lésions parmi les jeunes grimpeurs compétiteurs français ; 2- déterminer des facteurs de risque de blessure à l'entraînement. Un questionnaire a été adressé aux entraîneurs d'escalade de France. 4 blessés pour 5 blessures ont été recueillis. Les blessés semblaient s'entraîner plus que les non blessés, avoir un niveau de compétition supérieur et faire plus de compétitions par an. En préparation physique générale, les blessés semblaient moins travailler leur souplesse que les non blessés. Les blessés accordaient une importance moindre à l'échauffement et faisaient moins de travail cardio-respiratoire. Les entraînements des blessés présentaient des facteurs de risque connus de blessures d'hypersollicitation et de fractures épiphysaires. Il y avait une méconnaissance des jeunes et des entraîneurs concernant : (1) l'utilisation de méthodes à risque ; (2) les fractures de stress épiphysaires des doigts et leurs conséquences. Afin de prévenir ces fractures, il faudrait adapter l'entraînement et les compétitions aux enfants, et organiser une campagne d'information.

Mots-clés : escalade, enfant, fracture de stress épiphysaire

Introduction

Epiphyseal stress fractures of the finger's second phalanx base are predominant in young climbers (Chell, Stevens, Preston, & Davis, 1999; Desaldealer & Le Nen, 2016; Hochholzer & Schöffl, 2005; Schöffl & Schöffl, 2016; Schöffl, Popp, Küpper, & Schöffl, 2015). The objectives of the study were (1) to determine the incidence of these injuries among young French competitive climbers (9-18 years old) and (2) to determine injury risk factors during training.

Methods

A survey has been send to French climbing coaches. The inclusion criteria were young competitor climbers from 9 to 18 years old, with overuse injury of epiphyseal plate of finger, between September 2015 and April 2017. Data of non-injured climbers were sent spontaneously and compared to those of injured climbers.

Results

Among 178 questioned coaches, only 13 useable surveys were returned. Data of 4 injured climbers presenting 5 injuries were collected during the 18-month period (Table 1).

	Injured (n=4)	Uninjured (n=9)	
Number of climbers in the training group	9 [8-12.5]	12 [8.8-18.3]#	p=0.7
Number of training sessions per week	4 [3.5-4.3]	2.3 [2-4]#	p=0.2
Duration of a training session (hours)	2 [2-2.2]	2 [1.9-2.4]#	p=1
Competition maximal level			
Departemental	0	0	
Regional	1	1	
National	2	7	
International	1	1	
Number of competition per year			
<5	0	1	
5-10	1	6	
10-15	0	0	
15-20	2	1	
>20	1	1	

Table 1. General training informations. Data presented in median and interquartile range [25-75]. The two groups were compared by a Mann Whitney test.

Injured climbers seemed to train more, have a higher competition level and be engaged in more competitions per year than non-injured climbers.

100% of climbers were doing a general physical preparation, but injured climbers seemed to work less flexibility than non-injured.

During training among injured climbers, the importance given to warm-up was lower, and seemed also lower for stretching and hydration compared to non-injured. Injured climbers practiced less cardio-respiratory warm-up and seemed to do less joints mobilisations.

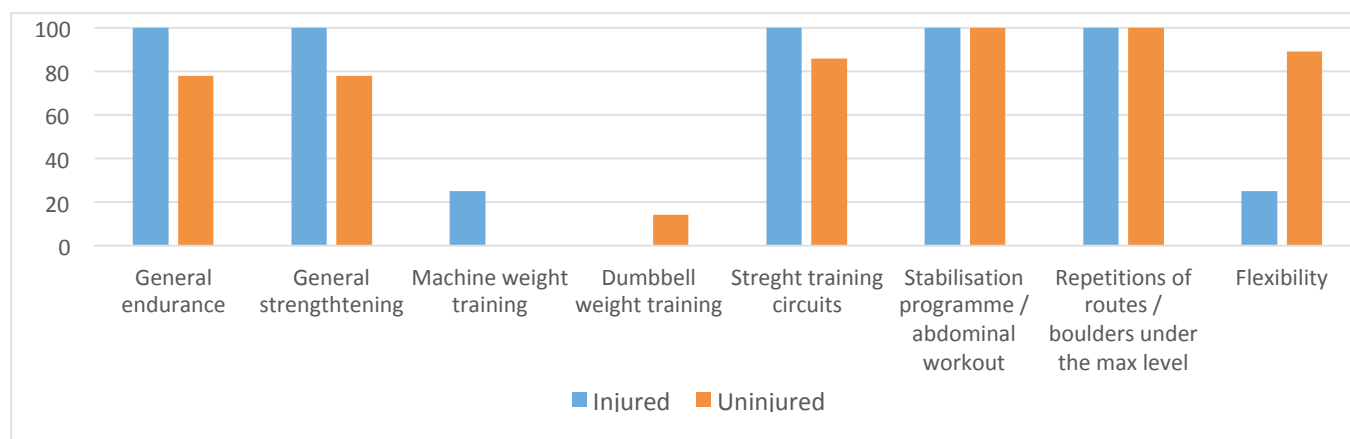


Figure 1. General physical preparation.

	Injured (n=4)	Uninjured (n=9)	
Importance given to warm-up	6 [4.5-7.3]	9 [7-10]	p=0.06
Duration of warm-up (mn)	30 [23.8-37.5]	25 [20-30]	p=0.52
Importance given to stretching	6.5 [5-7.25]	9 [7-10]	p=0.12
Duration of stretching (mn)	17.5 [15-21.3]	15 [10-25]	p=0.85
Importance given to hydration	9 [7.3-9.3]	10 [9.5-10]	p=0.21
Water consumption (L)	1 [0.9-1.2]	1 [0.8-1.3]	p=0.9

Table 2. Importance given to warm-up, stretching and hydration by coaches. The importance given to the various parameters was rated on a Likert scale (0-10). The data are presented in median and interquartile range [25-75]. The 2 groups were compared by a Mann Whitney test.

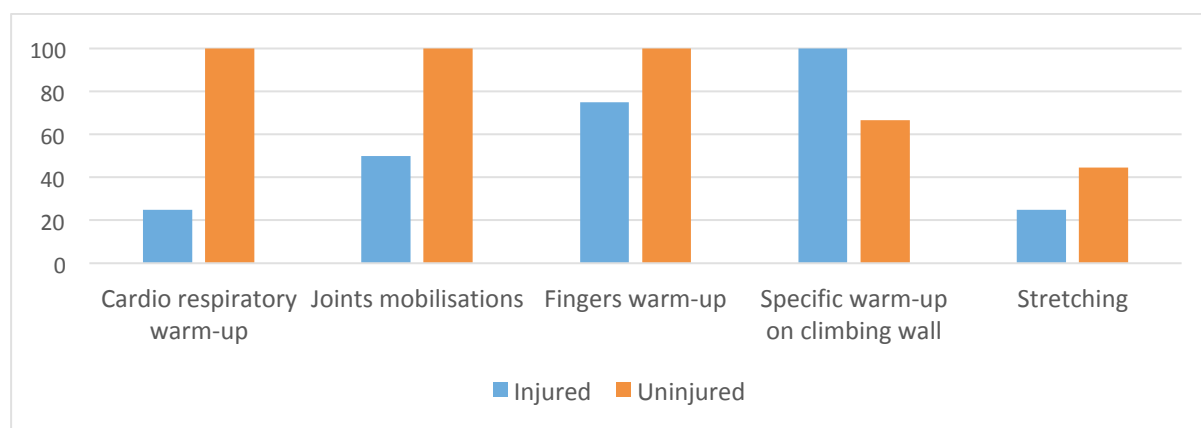


Figure 2. Type of warm-up.

100% of coaches had children made stretching. As specific upper limb strength training for climbing, 45.5% of trainers used hangboard and campus board and 72.7% the no foot, known to be at risk of injury.

Discussion

With 4 injured climbers in 18 months, our incidence seemed similar to those reported by Schöffl and Schöffl (2016) or T. Bayer *et al.* (2013) (5-6 injured climbers in 18 months). Injured climbers had heavier trainings than non-injured and a higher level of competitions, which are known risk factors for overused injuries (S Gnechi &

F Moutet, 2011; S Gnechi, F Moutet, & D Thomas, 2010; V Schöffl & I Schöffl, 2016). Less importance given to warm-up basics and less cardio-respiratory warm-up was a risk factor for finger epiphyseal stress fracture in our study. Flexibility was less worked among injured climbers while it is an overused-injury risk factor (S Gnechi & F Moutet, 2011; S Gnechi & F Moutet, 2011). If use of hangboard, campus board or no foot wasn't a risk factor of finger epiphyseal stress fracture in our study, they were widely use. Young people and trainers ignored restrictions and dangers of those methods. They also ignored epiphyseal stress fractures of fingers and their consequences. This lack of awareness, associated with uncared finger-pains and non-limitation among adolescents, can lead to delayed treatment, and therefore increase the risks of complications (J Chell, K Stevens, B Preston, & TR Davis, 1999; A Desaldeleer & D Le Nen, 2016; T Hochholzer & V Schöffl, 2005; V Schöffl & I Schöffl, 2016; V Schöffl, D Popp, T Küpper, & I Schöffl, 2015). Finally, too close international competitions prevented adequate recovery and seemed to promote injuries. Then, children training must be personalised, gradual and body-listening, to prevent finger epiphyseal stress fractures.

Development of motor skills and extension of gestural repertoire must underlie the training. Heavy training is inappropriate until the end of growth. Correct baselines and habits of training must be given to children: warm-up, stretching and hydration. Climbing holds must be fit for children (> 2cm), open-hand grip must be preferred, and routes must be specific for children. International calendar should be readjusted to allow adequate recovery between 2 competitions. Information must be delivered to youths and trainers concerning restrictions and dangers of training board, campus board and no foot. Personal practice of campus board must be supervised to avoid misuse. Weight-bearing climbing is inappropriate. During competitions involving adolescents, climbing holds must be adapted to avoid crimp grip and the number of boulders must be limited (D Costill & J Wilmore, 2006; S Gnechi & F Moutet, 2011; S Gnechi et al., 2010; T Hochholzer et al., 2012; V Schöffl & I Schöffl, 2016). Trainers and clubs have to be informed accordingly. Finally, children and their parents have to be informed on those injuries and their risks. All that information could be delivered by the French climbing federation (FFME).

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