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ORIGINAL ARTICLE

Effect of a strength training method characterized by an incremental number of repetitions across sets and a very short rest interval

Effet d'une méthode de musculation caractérisée par une augmentation des répétitions lors des séries successives et d'un très court intervalle de repos

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KEYWORDS

Skeletal muscle;
Resistance training;
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relation;
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Summary

Aim. – This study investigated the effect of a new strength training method (3/7 protocol) consisting of 5 sets with an incremental number of repetitions (3 to 7) and very short rest interval between sets (15 s).

Material and methods. – Thirty-eight young subjects were assigned to one of the 3 following protocols and trained 2 times per week for 8 weeks with bench press exercise. The efficacy of the 3/7 protocol was compared with that of two training protocols with a more classical design

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consisting of 4 or 8 sets of a constant number (6) of repetitions per set (4×6 and 8×6 protocols) and a rest interval of 2.5 min. The same load was used (70% of one repetition maximum [1RM]) in all protocols. In addition to the recording of the 1RM load, training effects were assessed by the recording of the force-velocity relation by means of a specific isokinetic ergometer.

Results. – After training, the 1RM increased more ($P < 0.05$) for the 3/7 (+29.8%) and 8×6 (+35.9%) protocols than the 4×6 protocol (+21.8%). Similarly, the maximal force augmented to a greater extent ($P < 0.05$) for the 3/7 (+22.4%) and 8×6 (+25.5%) protocols than the 4×6 (+9.9%) protocol. In contrast, greater gain ($P < 0.05$) in peak power was found for the 8×6 (+21.6%) compared with 4×6 (+8.4%) protocol with no significant difference between the 3/7 (+16.3%) and 4×6 protocols.

Conclusion. – The results of this study indicate that the 3/7 protocol is an efficient training modality to increase maximal strength.

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MOTS CLÉS

Muscle squelettique ;
Musclature ;
Relation
force-vitesse ;
Puissance ;
Développé couché

Résumé

Objectif. – Cette étude analyse les effets d'une nouvelle méthode de musculation (méthode 3/7) qui se caractérise par une incrémentation du nombre de répétitions (3 à 7) au cours de 5 séries successives et d'une période de récupération très courte (15 s) entre deux séries.

Matériel et méthodes. – Trente-huit sujets jeunes ont été répartis selon 3 groupes et se sont entraînés 2 fois par semaine pendant 8 semaines à l'exercice de développé couché. L'efficacité de la méthode 3/7 a été comparée à celle de deux protocoles plus classiques consistant en 4 ou 8 séries d'un nombre constant de répétitions (6) et d'un temps de récupération de 2,5 min entre les séries. Une même charge a été utilisée (70% de la charge maximale – 1RM) dans les trois protocoles. Outre la 1RM, les effets d'entraînement sur la relation force-vitesse obtenue au moyen d'un ergomètre isocinétique spécifique ont également été évalués.

Résultats. – Après entraînement, l'augmentation de la 1RM était plus importante ($p < 0,05$) pour les protocoles 3/7 (+29,8%) et 8×6 (+35,9%) que pour le protocole 4×6 (+21,8%). De même, la force maximale a augmenté davantage ($p < 0,05$) pour les protocoles 3/7 (+22,4%) et 8×6 (+25,5%) que pour le protocole 4×6 (+9,9%). Par contre pour le pic de puissance, un gain supérieur ($p < 0,05$) a été obtenu pour le protocole 8×6 (+21,6%) comparativement au protocole 4×6 (+8,4%), sans différence significative entre les protocoles 3/7 (+16,3%) et 4×6 .

Conclusion. – Nos résultats indiquent que la méthode 3/7 est une modalité d'entraînement efficace pour le développement de la force maximale.

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1. Introduction

To be effective, strength training programme should manipulate adequately many factors such as the intensity, volume (number of sets and repetitions), duration of the rest interval between sets, movement velocity, order of exercises and training frequency [1,2]. Although it received less attention compared with intensity and volume, the duration of rest interval between sets is an important variable as it can lead to different acute adjustments [3–5] and chronic adaptations [6,7]. Previous work suggests that even though short rest interval between sets decreases the total work performed due to metabolic changes [6], short rest interval might provide a superior stimulus for hypertrophy due to the greater acute elevation in growth hormone following the training session [2,4,8]. In agreement, more fatiguing protocols are associated with greater muscle protein signalling responses leading thereby to greater myofibrillar protein accretion over time [9]. In addition, single joint exercise performed with light load (20–30% of one repetition maximum [1RM]) under blood flow restriction (ischemia), another way to amplify the metabolic stress,

induces muscle hypertrophy (for reviews, see [10,11]). Thus, fatigue-related metabolic changes associated with short rest interval between sets may potentiate muscle hypertrophy and strength gain as already suggested by previous studies [12,13].

A new strength training method has been introduced by Legeard [14] aiming at inducing greater metabolic stress. This method, called the 3/7 protocol, consists of using moderate to high intensity loads ($\geq 70\%$) with an increasing number of repetitions per set (from 3 to 7 repetitions in 5 sets for a total of 25 repetitions) combined with very short rest interval (≤ 15 s). This method is unique in that the prescribed training volume is collapsed into a very short period of time (< 5 min). Its efficacy in term of maximal strength has been proved in the field and one can reasonably assume that it may induce more metabolic stress, at least in the second part of the exercise when fatigue accumulates, than training methods using similar volume and intensity with longer rest interval between sets. However, no study has investigated so far the training effects of the 3/7 protocol on strength and power in controlled laboratory conditions.

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