

## Functional training: a conceptual update

### *Treinamento funcional: uma atualização conceitual*

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**Abstract** – Functional training (FT) has grown in popularity; however, such growth is still disorganized and multifaceted. Thus, a conceptual “update” is necessary, especially based on how FT has been applied in most research. In this context, FT has been understood as the synergistic, integrated and balanced improvement of different physical capacities to ensure efficiency and safety during the daily tasks performance, based on the principles of training, and above all, on the principle of specificity. FT sessions should focus on improving basic movement patterns, adequately stimulating strength in various situations, muscle power, and cardiorespiratory capacity, frequently activating the stabilizing muscles and including complex activities, respecting safety and effectiveness criteria.

**Key words:** Sedentary lifestyle; Resistance training; Daily activities; Quality of life.

**Resumo** – O treinamento funcional (TF) tem crescido em popularidade, porém tal crescimento ainda ocorre de forma desorganizada e multifacetada. Assim, uma atualização conceitual se faz necessária, especialmente, baseado na maneira como o TF tem sido aplicado na maioria das pesquisas. Nesse contexto, o TF tem sido compreendido como aquele que objetiva o aprimoramento sinérgico, integrado e equilibrado de diferentes capacidades físicas para garantir eficiência e segurança durante o desempenho de tarefas cotidianas, sendo baseado nos princípios do treinamento, sobretudo, no princípio da especificidade. As sessões de TF devem focar no aprimoramento de padrões básicos de movimento, estimular adequadamente a força em diversas situações, a potência muscular e a capacidade cardiorrespiratória, ativar frequentemente músculos estabilizadores e incluir atividades complexas, respeitando critérios de segurança e eficácia.

**Palavras-chave:** Atividades diárias; Qualidade de vida; Sedentarismo; Treinamento resistido.

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## INTRODUCTION

### Functional Training: Concept Review

Since the publication of the point of view<sup>1</sup> on “Functional training: for what and for whom?”, many advances have been demonstrated in research involving functional training (FT) and new concepts have been solidified. That point of view defined the FT as the application of exercises that are similar to movements performed daily and aimed at the integrated improvement of physical valences aiming to guarantee autonomy during the performance of daily functions and has become popular but in a still very multifaceted way.

Considering this disorganized growth in the popularization and application of FT, both in research and in the practical performance of Physical Education professionals and Physiotherapists, our group has done efforts for the construction of review and opinion studies with information related to the real concept of FT, as approached in most scientific publications. From this perspective, in more recent publications<sup>2-4</sup>, we defined FT aimed at the synergistic, integrated and balanced improvement of different physical capacities to ensure efficiency and safety during the performance of daily, labor and/or sports tasks, based on the biological and methodological principles of training, especially on the principle of specificity. Therefore, different tools have been used, but the literature highlights strength training (and associated techniques) as a base tool<sup>5</sup>, but with an approach that emphasizes multisystemic adaptations (integrated improvement of strength, balance, coordination, power, among others) through the use of complexity as a primary progression strategy<sup>4</sup>.

Thus, although the literature clearly shows that every type of physical training generates functional adaptations, not every physical training program can be classified as “functional training” since FT is a broader training concept (as shown in the previous paragraph) and it is not simply limited to promoting functional adaptation.

Our point of view observes this type of conceptual “reinforcement” as necessary because together with the growth of FT in research, there is also a growing number of studies that explore other types of training that may, at some point, be confused with FT, such as multicomponent training (MCT) and multimodal training (MMT).

MCT and MMT are types of training that aim to improve general physical conditioning through training sessions that combine stimuli for different physical capacities<sup>6-8</sup>. However, unlike the FT, most studies involving MCT and MMT apply more traditional models of training, especially strength (use of machines; uniplanar, uniarticular exercises, cyclical, cadenced, stable), which gives little specificity, whereas, in FT, strength training is applied considering the characteristics of daily tasks (body weight and free weights; multiplanar, multiarticular, acyclic, high-speed exercises), that is, with high specificity. Thus, our perspective is that every FT program is multicomponent and multimodal by its nature, but not

every MCT and MMT program can be classified as “functional training”.

### **Functional training: main characteristics**

As we already mentioned, although the FT uses several tools, strength training is one of the main or maybe the main one in most of the literature. Thus, at first, we can consider that any intervention based on strength training can be an FT. However, most traditional strength training protocols are based predominantly on analytical exercises with isolated neuromuscular work, to especially improve maximum strength and muscle hypertrophy through stress in specific muscle groups.

To be considered “functional”, the training must focus on improving movement patterns that, according to Cook et al.<sup>9</sup> are intentional combinations of stable and mobile segments working in coordinated harmony to produce sequences of efficient movements. In this perspective, strength exercises should include patterns of squatting, pulling, pushing and carrying, always with a similar neuromuscular and metabolic specificity with the daily actions of the individual<sup>10</sup>. This specificity is related to the necessity of using the strength in the most diverse situations of the day-to-day that most of the time are unstable and asymmetrical, reinforcing the multisystemic demand.

For example, a simple walk depends on the strength in a situation that demands a certain level of dynamic balance, motor coordination, flexibility, and postural stability. If maintained for a long period, the muscle and cardiorespiratory resistance are added to the components mentioned above. In the case of a fast execution (crossing a street), power, speed, and agility are added to the demand<sup>11</sup>.

Considering this perspective, from a two-month intervention, Distanzo et al.<sup>12</sup> concluded that strength training programs that incorporate exercises with a high demand for flexibility, agility, balance, central stability and power were more effective than traditional training in improving functional performance measures in young adults. Other studies with similar interventions (high simultaneous demand for various physical capacities) have also shown better results of this type of intervention in the traditional training of the elderly population<sup>13,14</sup>.

Thus, based on the analysis of the characteristics of several studies, Box 1 summarizes the strategies used in the strength exercises applied in the FT to increase the simultaneous demand for other physical capacities<sup>4</sup>.

### **Functional training: training session structure**

As the FT is focused on movement patterns and the simultaneous stimulation of different physical valences, the preparation for a movement gains a prominent position in this type of training, both to ensure the maximum benefit from the stimuli and to ensure the physical integrity of the individuals during the performance of more complex tasks with or without the mobilization of overloads (strength training).

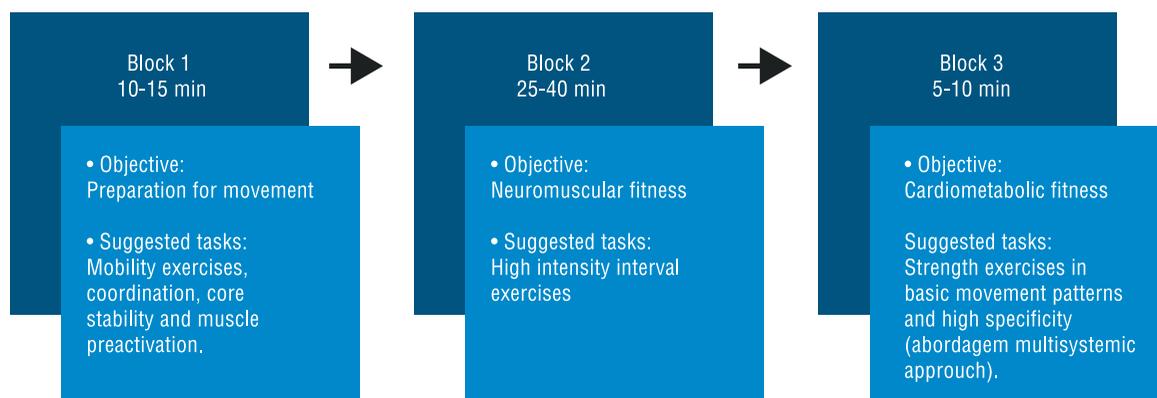
In addition, as cardiorespiratory conditioning is closely related to the

general physical fitness and several health parameters, the FT sessions aim to stimulate this capacity at higher levels than those usually seen in traditional strength training sessions.

Thus, considering the needs and characteristics mentioned above, our research group developed a structural model of the FT sessions that has been applied in several studies (Figure 1). In our point of view, this model can assist professionals and researchers to develop FT programs since it has shown interesting results related to multisystem adaptations in several published studies<sup>14,15</sup>.

**Box 1.** Strategies applied to strength exercises to increase the demand for other physical capacities.

Strategies	Example
Generic → Specific	Starting from a little specific task to a very specific task; for example from a leg press to a squat.
Lying/Sitting → Standing	Starting from a task with an intermediate base to a task without an intermediate base; for example from sitting development to standing development.
Uniplanar → Multiplanar	Starting from a task performed in a single movement plan to a task with several movement plans; for example from squat to side squat.
Unisegment → Multisegment	Starting from isolated arms or legs movements to combined arms and legs movements; for example from squat to thruster.
Slow → Fast	Starting from controlled movements to high-speed concentric movements; for example from squat to jump squat.
Stable → Unstable	Starting from stable to unstable conditions; for example, 1: from lifting bars to lifting kettlebells; 2: from stable to unstable bases.
Cyclic → Acyclic	Starting from cyclical organizations to non-cyclical organizations of the session; for example from multiple series to the circuit.
Bilateral → Unilateral	Starting from executions with both members to executions with only one member; for example from squat to pistol.
Simultaneous → Alternate	Starting from simultaneous movements to alternating movements between the members; for example from the traditional bench press to the dumbbell alternate bench press.
Simple task → Double task	Starting from exclusively physical tasks for the simultaneous execution of physical and cognitive tasks; for example from squat to squat counting from 100 to 0, subtracting 7.



**Figure 1.** Structural model of a functional training session

## FINAL COMMENTS

The term functional training is suggestive and appropriate for a systematization that aims at the synergistic, integrated and balanced improvement of different physical capacities to ensure the efficiency and safety during the performance of daily, labor and/or sports tasks, based on biological and methodological aspects of training, and notably based on the principle of specificity. In addition, the sessions should focus on improving basic movement patterns, adequately stimulating strength in unstable and asymmetric situations, muscle power and cardiorespiratory capacity, frequently activating stabilizing muscles and including complex activities, respecting safety and effectiveness criteria.

## COMPLIANCE WITH ETHICAL STANDARDS

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### Ethical approval

The research was written in accordance with the standards set by the Declaration of Helsinki.

### Conflict of interest statement

The authors have no conflict of interests to declare.

### Author Contributions

Conceived and designed the experiments: MEDSG, AGRN, and CVLST. Performed the experiments: MEDSG, AGRN, and CVLST. Analyzed the data: MEDSG, AGRN, and CVLST. Contributed reagents/materials/analysis tools: MEDSG, AGRN, and CVLST. Wrote the paper: MEDSG, AGRN, and CVLST.

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