



The influence of the diaphragm muscle on physiotherapeutic treatment through muscular chain methods

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Abstract

Introduction: The diaphragm is the main muscle for respiration, described as fundamental to muscular chain methods, but it is not entirely clear how it can influence the physiotherapeutic approach of global muscular chain methods.

Purpose: To highlight the influence of the diaphragm muscle on the physiotherapeutic approach of global muscular chain methods.

Material and methods: We carried out a systematic mini-review on standard-of-excellence scientific literature databases, using the following keywords: "*diaphragm muscle*", "*muscular chains*", "*Mézières method*", "*Busquet method*", "*GPR method*", and "*GDS method*" in Portuguese, Spanish and English, considering articles from the last 10 years.

Results: No articles that directly related the keywords "*diaphragm muscle*" with the muscular chain methods adopted in the present study were found. Isolating the keywords, we found different results in the search carried out in the databases according to the keyword used.

Conclusion: The influence of the diaphragm muscle on the performance of muscular chain methods is based on books and each author's clinical experiences. There are no articles in databases of scientific relevance that investigated the direct relationship between the diaphragm muscle and the muscular chain methods.

Keywords: diaphragm muscle, muscular chains, mézières method, busquet method, G.P.R. method and G.D.S. method

Introduction

The diaphragm muscle is considered the main breathing muscle for its constant performance in respiratory mechanics. It stands out for its relevance in global approaches and conducts for body organization. With particular characteristics in its composition and anatomical location, it is, directly and indirectly, related to structures of different human body systems. It crosses structures in the diaphragmatic dome, such as the aorta, inferior vena cava, esophagus, and nerves ^[1, 3].

Since the second half of the twentieth century, global methods of body organization have emerged, based on principles of muscular chains. The first of them came with the French physiotherapist Françoise Mézières, who highlighted the importance of the diaphragm muscle in her physical therapy approaches and conducts. Mézières said to her disciples: "when you don't know what else to do, release the diaphragm". Her disciples created methods known worldwide as Global Postural Re-education (GPR) by Phillippe Souhard, Godelive Denys-Struyf Muscular and Articular Chains (G.D.S.) by Godelieve Denys-Struyf, Busquet method by Leopold Busquet and Michele Busquet which, despite their different approaches, they still highlight the importance of the diaphragm muscle in their methods.

This highlight is not only for the treatment of respiratory disorders but also includes musculoskeletal disorders (e.g., low back pain), as well as problems related to the visceral system, psychobehavioral aspects (e.g., anxiety) and consequently postural changes ^[2, 4, 7].

However, the importance of these methods ends up being based on clinical experiences and not necessarily on what is considered scientific. Consequently, it becomes unclear how the diaphragm muscle can influence the physiotherapeutic approach of global muscular chain methods. However, the present study aims to highlight the influence of the diaphragm muscle on the physiotherapeutic approach of global muscular chain methods and, more specifically, how it can act on postural changes and assist in the treatment of dysfunctions.

Material and Methods

We performed a systematic mini-review using the following keywords: "*diaphragm muscle*", "*muscular chains*", "*Mézières method*", "*Busquet method*", "*GPR method*", and "*GDS method*" on Pubmed® and Scielo® databases, in Portuguese, Spanish and English, considering articles from the last 10 years. We carried out the search by experimental and review studies, preferably the most recent and mentioned ones, that had at least two of the keywords mentioned in this article, one of them being "*diaphragm muscle*".

Results

No articles that directly related the keywords "*diaphragm muscle*" to the muscular chain methods adopted in the present study were found. Isolating the keywords, we found different results in the search carried out in the databases according to the keyword used (table).

Table 1: Number of articles found on Pubmed® and Scielo® databases from 2010 to 2020.

Database	Keywords					
	Diaphragm	Muscular Chains	Mézières Method	Busquet Method	G.P.R. Method	G.D.S. Method
Pubmed®	12.264	3.208	7	0	23	1
Scielo®	217	3	1	0	12	1

Discussion

This study aimed to highlight the influence of the diaphragm muscle on the physiotherapeutic approach of global muscular chain methods and, more specifically, how it can act on postural changes and assist in the treatment of dysfunctions. Thus, we looked for scientific articles on standard-of-excellence databases. However, the results found according to the adopted criteria showed us that, so far, there is no scientific article that addresses this direct influence between the diaphragm muscle and muscular chain methods. This influence only appears indirectly.

In contrast, relevant articles are describing these methods, except for the Busquet method, which has not yet been found on the databases used in the present study. That highlights the importance of efficient respiratory mechanics, in which the diaphragm is the main muscle, to obtain better results in the treatment of patients. However, these articles do not highlight the importance and functionality of the diaphragm as it is found in materials written by the creators and representatives of the researched methods (Méthode Mézières: bases scientifiques, principes mécaniques, technique; RPG Reeducação Postural Global; Cadeias Musculares e Articulares – O método G.D.S. e As cadeias musculares; Método Busquet e as cadeias fisiológicas). These materials, in turn, are based on other works already established in the area of biomechanics, neurophysiology, anatomy and the creator's and representatives' clinical experiences [5, 8, 9, 11, 14].

That may lead to doubts about to what extent these authors' perspectives should be considered, given that they do not fit the current scientific standards of experimental studies for possible evidence. But the authors have clinical experience and their arguments are based on works already established in the literature. Therefore, they should not be disregarded because they do not present scientific studies that prove their hypotheses and statements.

In parallel, other authors also reinforce the importance of the diaphragm muscle, which helps in the arguments highlighted by the authors of these methods. Professor Jean-Pierre Barral (1987), deepened the subject that involves the relationship between the diaphragm muscle and the visceral system and released his work "Manipulations viscérales". According to Barral (1987), the first sign of some visceral dysfunction was presented with a reduction in mechanical ventilation. This happens because the visceral layer is only sensitive to chemical irritation or distension. In this case, the respiratory movement may distend it and cause the referred pain. Authors such as Chaitow, (2004), McGill *et al.*, (1995), Hodges *et al.*, (2001) emphasize the relationship between respiratory disorders and low back pain. If there is only hypercapnia (increased levels of carbon dioxide), for some reason, to make the performance of the spine stabilizing muscle be reduced, making the spine more vulnerable and prone to injury [4, 15, 18].

Notoriously, there is great relevance in the theme and future studies should be encouraged to clarify its influence, mainly the ones related to muscular chain methods, to provide a safer physiotherapeutic approach. However, even considering the results found irrelevant to the principles of what is strongly publicized in the health area, known as "evidence-based medicine", one should not underestimate this area and consider invalid what was supported by books and developed by clinical experiences. For this reason, authors like Horwitz *et al.*, (2017) bring a new perspective, of valuing the clinical experience called "evidence based on medicine", which respects the complexity and individuality of the human being [19].

Conclusion

The influence of the diaphragm muscle on the performance of muscular chain methods is based on books and each author's clinical experiences. There are no articles on databases of scientific relevance that investigated the direct relationship between the diaphragm muscle and the muscular chain methods.

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Conflicts of interest

There are no conflicts of interest related to the publication of this article.

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