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A myofascial component of pain in knee osteoarthritis

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ABSTRACT

Background: Osteoarthritis (OA) is the most common cause of musculoskeletal pain and disability. The knee is the most common site of OA. Numerous studies have shown an inconsistency between patients' reports of pain and their radiographic findings. This inconsistency may be partially explained by the fact that a portion of the pain originates from the myofascial trigger points (MTrPs) located in the surrounding muscles.

Aim: To assess the role of myofascial pain in OA patients.

Methods: Critical review. PubMed, Google Scholar, Scopus, and PEDro databases were searched from inception until December 2016 for the following keywords: "myofascial pain", "osteoarthritis", "trigger points", "knee" or any combination of these words. The reference lists of all articles retrieved were searched as well.

Results: The current review included two observational studies evaluating the prevalence of MTrPs in OA patients and six interventional studies describing the treatment of myofascial pain in OA patients. Data from two of the interventional studies also included an observational section.

Conclusion: The reviewed observational studies offered initial evidence as to the assumption that myofascial pain and the presence of MTrPs may play a role in pain and disability of knee OA. Because of the cross-sectional design of these studies, the causal relationships could not be established. Additional studies are needed to confirm this assumption as well as to clarify if MTrPs are a portion of OA etiology or that OA is the basis for MTrPs formation. Each interventional study elaborated on various myofascial treatment techniques. However, treatment focusing on MTrPs seems to be effective in reducing pain and improving function in OA patients. Due to the heterogeneity in treatment methods and outcome measures, it is difficult to attain a definite conclusion and therefore, additional high-quality randomized controlled trials are warranted.

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1. Introduction

Osteoarthritis (OA) is the most common cause of musculoskeletal pain and disability. It is a chronic degenerative disorder of multifactorial etiology, including acute and/or chronic insults from normal wear and tear, age, obesity and joint injury. The true pathogenesis remains poorly understood. OA is characterized by a degradation of the articular cartilage, resulting in an alteration of its biomechanical properties, which in turn contributes to a focal loss of articular cartilage, loss of joint space, osteophyte formation, focal areas of synovitis, periarticular bone remodeling and subchondral

cysts (Harish and Kashif, 2013; Pollard et al., 2008). OA presents with symptoms such as joint pain, stiffness, motion limitations, motor and sensory dysfunction and functional impairments, thus, preventing patients from participating in regular physical activities (Harish and Kashif, 2013). The common sites of OA appear on the knees, hands, and hips, whereas knee OA is the most common (Joern et al., 2010).

Pain is the most frequent complaint for patients with knee OA to seek medical attention. If left untreated, pain and stiffness can result in a loss of physical function and independence during daily activities. The presence of OA-related knee pain has also been associated with increased risks of physical disability in the community (Harish and Kashif, 2013).

Many studies have revealed a discrepancy between patients' reports of pain and their radiographic findings (Kornaat et al., 2006; Link et al., 2003; Pollard et al., 2008). A plausible option is that the

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pain originates from the myofascial trigger points (MTrPs) in the surrounding muscles (myofascial pain) and cannot be visualized by imaging.

The term myofascial pain is defined as “the complex of sensory, motor, and autonomic symptoms caused by MTrPs” (Simons et al., 1999). MTrPs, hyperirritable spots found in the skeletal muscles, are associated with hypersensitive palpable nodules located in a taut band. The spots are painful on compression and may produce characteristic referred pain, referred tenderness, motor dysfunction, and autonomic phenomena. Two different types of MTrPs have been described: 1) active MTrPs associated with spontaneous complaints of pain; 2) latent MTrPs that do not cause spontaneous pain, however, pain may be elicited by manual pressure on the MTrPs. It has also been hypothesized that latent MTrPs restrict the range of motion (ROM) and alter motor recruitment patterns (Bron et al., 2007).

The purpose of this critical review (Grant and Booth, 2009) was to assess the role of myofascial pain in knee OA patients. Our hypotheses were: 1) the pain experienced in knee OA is associated with the prevalence of MTrPs in the surrounding muscles; 2) treatment focusing on myofascial pain is effective in reducing pain and improving function in patients with knee OA.

2. Methods

PubMed, Google Scholar, Scopus, and PEDro databases were searched from inception until December 2016 using predefined search strategies. The databases were searched for the following keywords: “knee pain”, “osteoarthritis”, “myofascial pain”, “trigger points”, “myofascial release therapy”, “soft tissue manipulation” or any combination of these words. The search results were pooled and duplicates removed. The titles and abstracts of all articles were reviewed. Criteria for inclusion in the review were studies investigating the association between myofascial pain and knee OA or treatment of OA by MTrPs. We analyzed all published material with an emphasis on randomized controlled trials (RCTs). Trials of any methodological quality and only trials written in English were included in the review. The reference lists of all articles retrieved in full were also searched.

3. Results

Eight papers were included in this review: two observational studies, one quasi-experimental and five RCTs.

3.1. Observational studies on the prevalence of myofascial pain in knee OA patients

Prevalence of MTrPs in the studied muscles is summarized in Table 1.

A recent observational cross-sectional study (Albuquerque-García et al., 2015), examined whether referred pain elicited by active MTrPs reproduced the symptoms in individuals with painful knee OA and if a relationship between the presence of active MTrPs with intensity of ongoing pain, function, quality of life and sleep quality exists in individuals with painful knee OA. The sample consisted of 18 women with bilateral knee OA and 18 matched controls, who had experienced no knee pain during the past year.

All subjects underwent an MTrPs examination by an experienced assessor who examined the tensor fascia lata, sartorius, rectus femoris, vastus lateralis, vastus medialis, gracilis, biceps femoris, semitendinosus, gastrocnemius, and the tibialis anterior muscles. The results demonstrated that women with knee OA exhibited a significantly greater number of active MTrPs (mean 1 ± 1 ; $p < 0.001$) and a similar number of latent MTrPs (mean 4 ± 2) compared to healthy women (mean 4 ± 3 ; $p = 0.613$). The following muscles were found with the highest prevalence for active MTrPs: the vastus medialis, vastus lateralis, gastrocnemius and sartorius, all with an MTrPs prevalence of 11.1%. The muscles with less prevalence of active MTrPs were the gracilis, tibialis anterior and rectus femoris, all with 5.5% prevalence. No active MTrPs were found in the tensor fascia lata, biceps femoris and semitendinosus muscles. A greater number of active MTrPs was associated with a higher intensity of ongoing pain ($r = 0.605$; $p = 0.007$) and lower physical function ($p < 0.05$) (Albuquerque-García et al., 2015).

In another observational study (Bajaj et al., 2001), 28 subjects were examined (14 with OA of the hip, knee or both and 14 healthy controls). One experienced assessor examined all subjects in a randomized sequence of sides and sites to minimize order effects. The examined muscles were: the tensor fascia lata, rectus femoris,

Table 1
Prevalence of MTrPs in knee OA.

	Albuquerque-García et al., 2015		Bajaj et al., 2001		Henry et al., 2012	Itoh et al., 2008
	Cases	Controls**	Cases*	Controls**		
Iliopsoas						40%
Gluteus medius			7.1%	0%		
Gluteus minimus						20%
Gluteus maximus			7.1%	0%		
Tensor fascia lata	0%	0%	35.7%	28.6%		
Sartorius	11.1%	0%				20%
Rectus femoris	5.5%	0%	64.3%	14.3%		60%
Vastus lateralis	11.1%	0%	7.1%	0%	29%	
Vastus medialis	11.1%	0%	21.4%	0%	67%	
Gracilis	5.5%	0%				
Biceps femoris	0%	0%	21.4%	0%		40%
Semitendinosus	0%	0%				
Popliteus						20%
Gastrocnemius	11.1%	0%	57.1%	14.3%	92%	
Soleus			21.4%	0%		
Tibialis anterior	5.5%	0%				
Peroneus longus			7.1%	7.1%		
Peroneus brevis			14.3%	14.3%		

*examined subjects suffered from OA of the hip, knee or both; **controls were healthy subjects (without OA in low limbs).

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