

# Mesotherapy improves range of motion in patients with rotator cuff tendinitis

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## ABSTRACT

There is published evidence on the effect of mesotherapy for inflammatory shoulder diseases. **Objective:** Evaluate the gain in range of motion (ROM) in patients with rotator cuff tendinopathy treated with mesotherapy. A retrospective series of cases conducted from medical records. Location: an outpatient rehabilitation and orthopedic service. 145 patients with clinical diagnosis of rotator cuff tendinopathy, with limited active range of motion. **Method:** The study subjects were treated with mesotherapy between 1995 and 2008, the blends were selected according to the patient's profile and tolerance. The effect on the ROM was qualified as "not improved" or "improved". The improvement in symptomatology was correlated to age, duration of symptoms, and drugs used in the mesotherapy. The concomitant application of physical therapy was also correlated with the result. The adverse effects were evaluated systematically. **Results:** 117 patients (80.7%) presented objective improvement of ROM or of pain. The result was not influenced by age, duration of symptoms, or by the concomitant application of physical therapy. Only smaller adverse effects were observed. **Conclusion:** This study suggests that mesotherapy can be efficient in the treatment of rotator cuff tendinopathy, for the improvement of pain, ROM, or global functioning of the upper limb. The clinical impact of this study is that mesotherapy can be associated with the standard physical therapy treatment to improve ROM and pain in rotator cuff tendinopathy.

**Keywords:** mesotherapy, rotator cuff, seepage, shoulder, tendinopathy

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## INTRODUCTION

Broad mobility in the upper limbs depends on an integrated and stable scapular girdle anatomy.<sup>1</sup> Any interference with this anatomy can seriously compromise the shoulder function, leading to a significant reduction in functionality and quality of life.

Tendinopathy of the rotator cuff (RCT) interferes with shoulder functions due to a dysfunction of the main dynamic stabilizer of the glenohumeral joint.<sup>2</sup> RCT characteristically shows up as pain or weakness in the upper limb; it occurs less frequently as a reduction in the passive range of motion (ROM),<sup>3</sup> but limitation is common in active movement.<sup>4</sup> Pain is typically the cause of this limitation and can be explained by the presence of pain mediators in acute cases and by hypoxia and tissue degeneration in chronic cases.<sup>5</sup>

Conservative treatment brings good results as to the evolution of RCT, so it needs to be a front-line therapy option. Rest, cryotherapy, modifying pain-inducing activities, exercises for ROM, specific strengthening, non-hormonal anti-inflammatories, and corticoid infiltrations are being hailed with positive effects in the management of this affliction.<sup>6</sup>

Mesotherapy is included among the non-surgical modalities for treating painful afflictions of the musculoskeletal system.<sup>7</sup> It consists of intradermal injections of a mixture of small doses of allopathic medications into systematically defined points.<sup>8</sup> The advantages of this technique are the analgesic power and the reduction of adverse effects of these drugs, which was shown by our group in the treatment of carpal tunnel syndrome.<sup>9</sup>

## OBJECTIVE

Since mesotherapy is still not used as a routine therapeutic strategy for RCT, the objective of this study was to describe the improvement in ROM of the shoulder in patients undergoing this type of treatment.

## METHOD

This was a retrospective epidemiological study of patients of both genders with RCT and limitation of ROM who were treated with mesotherapy between July 1995 and December 2008 in a clinic in Rio de Janeiro, Brazil. The patients were diagnosed by an orthopedist experienced in shoulder surgery and in sports traumatology.

The mesotherapy sessions were held every week. The drug cocktail included non-hormonal anti-inflammatories (diclofenac or meloxicam), a coumarin derivative (melilotus extract with rutin), and a local anesthetic (procaine), sometimes associated with a vasodilator (bufomedil) after the third session. The choice of drugs was based on each patient's history and clinical suspicions of hypersensitivity. In patients with a history of allergy to coumarin derivatives, water was used as a vehicle. The injections were applied on the anterior or lateral faces of the shoulder, according to a grid pattern where each point was 1.0 cm away from the others. The needles used were 4mm in length and 30G in diameter<sup>10,11</sup> and 0.2 ml of the cocktail was applied at each point. No patient received corticoid injections. When instituted, the concomitant treatment of physiotherapy followed the Rookwood protocol.<sup>12</sup> Adverse effects were listed according to their order of occurrence.

Subjects' ROM were evaluated with bi-dimensional goniometers for active abduction and internal and external rotation, before and after treatment. The subjects were oriented to move their upper limbs as much as pain permitted. The treatments at the end of the course were categorized as "improved" if there was any increase in active ROM and "not improved" if the limitation persisted or worsened in any direction.

The non-parametric Mann-Whitney test and the chi-squared test were used to compare the evolution of the active ROM or other qualitative variables. The variable phi was calculated in analyzing the association of dichotomous variables. Confidence intervals of 95% were calculated for the proportions of each category of the ROM evolution variable.

## RESULTS

The studied sample consisted of 72 women (49.7%) and 73 men (50.3%) aged from 18 to 87 (average 52.5 years). One hundred twelve patients (77.2%) had had symptoms for more than 30 days. There was no statistically significant difference between the age groups and the response to treatment with ROM increases (Table 1).

One hundred seventeen patients (80.7%) improved their ROM. The number of sessions, and hence the duration of the treatment, varied according to the improvement of the symptoms: 61.4% received between 4 and 9 sessions of mesotherapy and 70.3% of the cases were treated for up to 12 weeks.

Table 2 shows the characteristics of each cocktail with respect to drugs and volumes for the 145 patients treated. There was a statistically significant increase in the ROM when vasodilators were added to the cocktail (125 patients,  $p = 0.012$ ). Nonetheless the concomitant physiotherapy did not show any statistically significant correlation with the evolution of the ROM ( $p = 0.072$ ).

Five patients (3.4%) showed some immediate effect after the application of the mesotherapy, including flushing (0.7%), local discomfort (0.7%), fainting (1.4%), and allergic reaction (0.7%). Delayed aftereffects were reported by 44 patients (30.3%) and included cutaneous hypersensitivity (22.8%), local itching (6.2%), and allergic reactions (1.3%). There were no serious side effects.

## DISCUSSION

Shoulder pain and limited ROM is common among patients with RCT and affects a large number of individuals in different age groups. Clinical experience shows that patients with similar lesions can have different symptoms and responses to therapy. Cofield<sup>13</sup> saw that conservative treatment in patients with chronic pain that had RCT came out with favorable results in less than 50% of cases. However, other studies showed satisfactory results with conservative treatment ranging from 44 to 82%.<sup>11,14-16</sup>

Evaluating gains in active ROM in patients with RCT receiving mesotherapy treatment was the objective of this study. The evolution was favorable in 80.7% of the patients, showing a reduction of impairments for daily activities and sports. Similar results were had by Metsavaht<sup>7</sup> who obtained complete relief of pain and limitations to daily activities in 78.9% at the end of the mesotherapy treatment in patients with recent symptomatic onset. Similarly positive results were obtained in the treatment of chronic and lateral tendinopathies of the elbow.<sup>17</sup>

Mesotherapy can explain the results from our study for it permits the simultaneous use of anti-inflammatories, vasodilators, and drugs that reduce swelling over a long period with local action. McNeill et al.<sup>18</sup> proved this fact, observing that the concentration of piroxicam in the deltoid muscle of rats was 5 to 15 times greater when applied locally than when the same drug was administered endovenously.

One of the theories that standardized mesotherapy was based on a study of scintigraphy and suggested that intradermotherapy acted

**Table 1.** Associations between the gain in the shoulder joint's range of motion with age, gender, and time with the injury

Characteristics	Total n (%)	Evolution of range of motion		p-value*
		Improved n (%)	Not Improved n (%)	
<b>Gender</b>				
Male	73 (100.0)	59 (80.8)	14 (19.2)	0,968
<b>Age</b>				
18 to 40 years	18 (100.0)	12 (66.7)	6 (33.3)	0,448
41 to 50 years	28 (100.0)	23 (82.1)	5 (17.9)	
51 to 60 years	44 (100.0)	36 (81.8)	8 (18.2)	
61 to 87 years	55 (100.0)	46 (83.6)	9 (16.4)	
<b>Time with lesion</b>				
< 30 days	33 (100.0)	26 (78.8)	7 (21.2)	0,270
30 to 180 days	57 (100.0)	43 (75.4)	14 (24.6)	
> 180 days	55 (100.0)	48 (87.3)	7 (12.7)	

\* Chi-squared test

**Table 2.** Frequency of use of each one of the cocktails used

Blend	n	%
DEP (D: 1 ml sodium diclofenac + E: 1 ml melilotus/rutin + P: 1 ml procaine)	93	64.1
MoEP (Mo: 1 ml meloxicam + E: 1 ml melilotus/rutin + P: 1 ml procaine)	44	30.3
MoADP (Mo: 1 ml meloxicam + AD: 1 ml distilled water + P: 1 ml procaine)	8	5.5
Total	145	100.0

in two ways: the activity occurred by stimulating dermal receptors *in situ*, or over long distances to other organs by circulation. In this way the diffusion of the medications used in mesotherapy has been demonstrated. Hence local receptors as well as more distant ones can be stimulated.<sup>19</sup> Based on these suppositions the more fragmented the substance is that is being injected, or the greater the number of points of application, the greater will be the meso-interface and the greater will be the number of dermal receptors activated.<sup>19</sup>

Clinical treatment directed at pathological alterations in the tendon is considered ideal, however, once the pain symptoms become clinical, efforts must be directed towards pain relief.<sup>20</sup> The regular use of non-hormonal anti-inflammatories over short periods is associated with the reduction of pain in the acute phase.<sup>21</sup> The greatest limitation to the use of these drugs is the high incidence of adverse effects, especially when its use must be prolonged.<sup>7</sup> Infiltration with corticosteroids also promotes rapid pain relief, but its long-term effectiveness has not been demonstrated yet,<sup>22</sup> and some injurious effects on the tissues have been repeatedly demonstrated.<sup>23-26</sup> The local effects of vasodilators such as buflomedil hydrochloride and procaine can make a positive contribution considering that some of the symptoms of these afflictions are occasioned by a degree

of hypoxia in the tendinous tissue. The small amount injected, meanwhile, causes no systemic alteration.<sup>27,28</sup>

The limitation of this study is the absence of a control group and the variation in the use of the cocktails and the number of sessions. The majority of our patients had chronic complaints and the period of improvement was simultaneous to the treatment, so we can conclude that the treatment was successful. We can, however, affirm that the placebo effect had some effect in the positive results. We understand that this is essentially the description of our results and they can be confirmed by a better-designed clinical trial. The variations in the use of the cocktails by the use of vasodilators and other components was determined mainly by the individual's sensitivity profile and reflects the reality of clinical practice; the same may be said about the duration of the treatment.

## CONCLUSION

RCT patients treated with mesotherapy showed an increase in ROM and relief from pain. Few adverse effects were observed, particularly among patients with hypertension, diabetes mellitus, or dyspepsia. Therefore we believe that mesotherapy could be of great value for the non-surgical treatment of RCT.

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