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Original Article

Artigo Original

Immediate effect of laryngeal manual therapy in dysphonic individuals

Efeito imediato da terapia manual laríngea em indivíduos disfônicos

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Keywords

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ABSTRACT

Purposes: To investigate the immediate effect of Laryngeal Manual Therapy (LMT) in musculoskeletal pain, in voice and sensations referred to individuals with behavioral dysphonia and individuals without it. **Methods:** 30 individuals ranging from 18 to 45 years old were selected and sorted into two groups: the dysphonic group (DG) – 15 individuals with functional or organofunctional dysphonia, and the control group (CG) – 15 individuals without vocal complaints and with non-impaired voices. The individuals answered a pain questionnaire and their voices were subsequently registered. The initial evaluation was repeated after the LMT. The LMT was applied for 20 minutes. After the LMT, the individuals were self-evaluated in terms of sensations in their voices, larynxes, articulations and respiration. **Results:** After the application of LMT, the DG reported significant improvement of pain in the following areas: temporal, larynx, posterior neck, wrists/hands/fingers, upper and lower back, hip/thigh, which did not occur in CG. The perceptual analysis of the vowel /a/ revealed no significant difference in any parameter in both groups after the LMT. The analysis of the speech showed that there was an increase of the roughness parameter after the application of LMT just in the DG. The DG individuals reported better sensations in the larynx and articulations after the submission to LMT, which did not occur in CG. **Conclusion:** this study clarified that TML immediately reduces the intensity of corporal pain in dysphonic individuals, which did not occur in individuals without any vocal impairments. Although the perceptual analysis reveals an increase of the roughness in the quality of the voice, positive sensation in the larynx and articulation were reported by dysphonic individuals after the application of TML.

Descritores

Voz
Disfonia
Dor
Medição da Dor
Relaxamento

RESUMO

Objetivos: Verificar o efeito imediato da terapia manual laríngea (TML) na dor musculoesquelética, na voz e nas sensações autorreferidas em indivíduos com disfonia funcional/organofuncional de origem comportamental e em indivíduos sem disfonia. **Métodos:** Participaram 30 indivíduos do gênero feminino e masculino, com idade entre 18 e 45 anos. Foram divididos em grupo disfônico (GD), 15 indivíduos com disfonia funcional/organofuncional; e grupo controle (GC), 15 indivíduos com vozes saudáveis, sem queixas vocais. Todos preencheram questionário de investigação de dor e foram submetidos a registro vocal para posterior avaliação perceptivo-auditiva e acústica da voz. Aplicou-se a TML por 20 minutos em ambos os grupos e repetiu-se a avaliação inicial. Após a TML, os indivíduos realizaram autoavaliação referente às sensações vocais, laríngeas, articulatórias e respiratórias. **Resultados:** No GD observou-se diminuição da dor após aplicação da TML nas regiões: temporal, laringe, parte posterior do pescoço, punhos/mãos/dedos, parte superior e inferior das costas, quadril/coxas, não observado no GC. A análise perceptivo-auditiva da vogal /a/ revelou que não houve diferença significante em nenhum parâmetro de ambos os grupos após TML. Na fala espontânea, houve piora no parâmetro rugosidade após a TML apenas no GD. Os indivíduos do GD relataram melhor sensação na laringe e articulação após a TML, o mesmo não foi observado no GC. **Conclusão:** A TML diminuiu a intensidade da dor corporal em disfônicos, o que não ocorreu com os indivíduos sem alterações vocais. Apesar da análise perceptivo-auditiva revelar aumento da rugosidade vocal, foram relatadas sensações positivas na laringe e na articulação pelos disfônicos após a TML.

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INTRODUCTION

Individuals with dysphonia related to vocal behavior, called functional or organofunctional[1], may have changes in cervical and perilaryngeal muscles[2,3], muscle pain at rest or during function[2,4], hyperactivity of extrinsic laryngeal muscles[5], limitation in the amplitude of the cervical movement[2,4], and even postural changes[5,6].

Traditionally, the treatment of dysphonia related to muscle change uses body techniques, laryngeal massage and massage on the shoulder girdle, postural changes in the neck and shoulder, besides techniques to soften the production and the stabilization of emission[7].

With the specific goal of minimizing the symptoms related to the lack of balance in cervical and perilaryngeal muscles, techniques using manual therapy have been developed by professionals from several fields, such as speech-language pathologists[8-11], osteopathic physicians[12], and physical therapists[13]. Manual therapy has been used more often to treat dysphonia, when muscle and postural imbalances are present[14-17]. Therefore, literature also begins to provide scientific evidence showing the efficacy of this type of intervention[10,11,17-19].

In 1990, the manual circumlaryngeal technique to reduce musculoskeletal tension associated with vocal hyperfunction was described[20]. The main objective of manual circumlaryngeal technique is to relax the laryngeal muscles, excessively tense, which ends up inhibiting the balance of phonatory function. The high position of the larynx in the neck may influence the vocal function, changing length control and the rigidity of vocal folds, which contributes to the imbalance of the vocal quality[21,22].

Despite being different from the manual circumlaryngeal therapy, the laryngeal manual therapy[11] (LMT) also aims at relaxing cervical and perilaryngeal muscles; however, it works with the sternocleidomastoid and the suprahyoid muscles and the thyrohyoid membrane region[11]. Therefore, LMT works first with the sternocleidomastoid muscles, and, only then, the suprahyoid and the laryngeal muscles are manipulated[11]. Positive results have been reached by this technique, such as the reduced frequency and intensity of vocal discomfort and improved vocal quality[11]. LMT proposal is recent[11]; so, it requires more scientific studies to support clinical practice in order to know its effects better.

The objective of this study was to verify the immediate effect of LMT on musculoskeletal pain, on vocal quality, and on the sensations self-reported by individuals with behavioral functional/organofunctional dysphonia and by individuals without dysphonia.

METHODS

This is a clinical, prospective, and nonrandomized study. Thirty adult individuals, from both genders, aged between 18 and 45 years were analyzed and divided into two groups: dysphonic group (DG) composed of 15 individuals (12 women with mean age of 27.6 years, and 3 men with mean age of 26.6 years), complaining of vocal changes and functional or organofunctional dysphonia. They were submitted to otorhinolaryngological examination and showed cleft, thickening, polyps, vocal nodules, and cysts (Chart 1); and the control group (CG), with 15 individuals (12 women with mean age of 20.8 years, and 3 men with mean age of 25.3 years), without vocal complaints and healthy voices, observed by a speech–language pathology and audiology vocal assessment. The groups were paired according to gender and age.

To compose the DG and the CG, the exclusion criteria followed were: individuals aged more than 45 years, those with neurological dysphonia or who had presented any general neurological alteration; people who underwent surgery in the larynx; individuals with report of thyroid changes (hypo or hyperthyroidism); people reporting changes or those who underwent treatments in the cervical spine; those reporting any sort of heart conditions; and people who do weight lifting and smokers.

The CG also excluded individuals who presented history of dysphonia or those who declared feeling discomfort in the larynx after the intensive use of the voice.

The research was in accordance with the National Health Council (Resolution 196/96) and was initiated after being submitted to and approved by the Ethics Committee of the Dentistry College of Bauru, at Universidade de São Paulo (CEP – 099/2011). All individuals signed the informed consent form.

Participants were investigated as to the location and intensity of musculoskeletal pain and were then submitted to the vocal recording, which allowed the auditory-perceptual and acoustic analysis of voice. The procedures will be described next.

Investigation of musculoskeletal pain

A protocol called Musculoskeletal Pain Questionnaire[23] was used to investigate the location of the pain, through the design of the body parts corresponding to the items to be checked. The investigated parts were: temporal region, masseter muscles, submandibular region, larynx, anterior and posterior neck regions, shoulders, upper back, hips/thighs, knees, and ankles/feet. In this protocol, individuals indicated the part where pain was present in the last 12 months, and, for each body part, there was a 100-millimeter analog visual scale to measure the intensity of pain; in case it was present at the time, the protocol was being applied. For each pain location, individuals used a vertical line on the scale to point to what would characterize the pain and the limit to the left referred to no pain and to the

Chart 1. Distribution of the dysphonic group according to the otorhinolaryngological diagnosis

Otorhinolaryngological diagnosis	Dysphonic group n (%)
Bilateral thickening and median-posterior triangular chink	2 (13.3)
Bilateral nodules and median-posterior triangular chink or in dumbbell	5 (33.3)
Median-posterior triangular chink	4 (26.7)
Pseudocyst or cyst, contralateral nodule reaction, and median-posterior chink or in dumbbell	3 (20)
Polyp	1 (6.7)

right to the worst possible pain. Then, these markings were measured with a ruler, in millimeters, to perform the statistical analysis. This procedure was repeated after LMT was conducted. The individuals had no access to the initial markings made before the procedure.

Vocal assessment

Individuals from both groups were submitted to the voice recording in an acoustically treated studio. For that procedure, the software of professional audio edition – Sound Forge 10.0 was used, in a sampling rate of 44,100 Hz, 16-bit mono channel, and AKG microphone, model C 444 PP, attached to the computer. The vowel "a" was produced alone and was sustained, after a deep breath and spontaneous talk for 30 seconds, responding to the question: "What did you do yesterday?" and "Let me know about your work," being all emissions in closer to those that are common for the individual in terms of frequency and intensity.

Auditory-perceptual analysis

For the auditory-perceptual analysis, vocal recordings were randomized and sent to three judges – speech-language pathologists specialized in voice, with experience in the field, and double-blinded. The following parameters were analyzed: general level of voice quality (global impression of voice quality), roughness (irregularity in the sound source), breathiness (audible air escape), tension (sensation of vocal effort), and instability (changes in intensity and frequency). In the analysis of spontaneous speech, the following were added: resonance (molding and projecting sound in space) and speech articulation (motor adjustments to produce speech sounds). For each assessed parameter, a protocol was used and the evaluator marked with an "x," in a table corresponding to each subject, which vocal parameter was better: if emission "a" was better, if emission "b" or if "a" and "b" were the same. After the evaluations, the results of each evaluator were translated in order to identify the moments "before LMT" and "after LMT." For the statistical analysis of auditory-perceptual analyses, the response that was mostly agreed by the judges was chosen. When they did not agree, the option "no change" was selected.

Acoustic analysis

The computerized voice analysis was conducted with the software Multi Dimensional Voice Program (MDVP) – Model 5105, by KayPENTAX, and the sample chosen for analysis was the emission of the vowel "a," ruling out the beginning and the end of the emission and observing: fundamental frequency (f0), disturbance measures: jitter in %, shimmer in %, and noise measurement: noise-to-harmonics ratio (NHR).

Application of LMT

After the first evaluations, LMT was conducted for 20 minutes, while the individual was comfortably sitting on a chair. The therapist stood behind the person and began to massage the sternocleidomastoid muscle, the suprahyoid muscles, and the larynx, bilaterally, with descending circular movements, massaging, and stretching each muscle group, besides displacing the larynx[11]. During the procedure, the person was in silence and was asked to breathe calmly, trying to relax the shoulders and the jaw, without dental contact. The time division for each muscle group and region manipulated was proposed according to the pilot study, which observed that sternocleidomastoid and suprahyoid muscles required more time for relaxation. Therefore, time proposed by the literature[11] was adjusted as follows:

- five minutes of massage on sternocleidomastoid muscles;
- five minutes of massage on the suprahyoid region;
- repetition of 3 minutes of massage on sternocleidomastoid muscles;
- repetition of 3 minutes of massage on the suprahyoid region;
- two minutes of sliding and lowering movements on the larynx region;
- two minutes of displacement movements on the thyroid region.

Individuals were advised not to emit any sound during LMT. After it was conducted, all initial evaluations (musculoskeletal pain investigation and voice records for further auditory-perceptual and acoustic voice evaluation) were immediately repeated. Besides, individuals were invited to report sensations referring to voice, larynx, articulation, and breathing in the application of another questionnaire with open questions, so that they could describe how they felt after LMT regarding the mentioned items. The person should answer by choosing the statements: "I didn't feel the difference;" "Negative sensations, which ones?;" "Positive sensations, which ones?"

Data analysis

Data from the visual analog scale regarding the reported pain intensity, before and after LMT, from individuals in both groups, were analyzed by the Wilcoxon test ($p \leq 0.05$).

Data regarding the perceptual-auditory analysis were submitted to the Kappa agreement test for the intrajudge agreement evaluation. Then, the answer that was mostly agreed by the three judges was selected, and the Signals Test was carried out to compare pre- and postLMT moments in each analyzed group. The Signals Test was also used to get data regarding the sensations reported after LMT. All statistical tests showed a 5% significance level.

RESULTS

Table 1 shows the results regarding the location and intensity of pain reported before and after LMT. In the DG, pain was reduced after LMT in the following regions: temporal, larynx, posterior region of the neck, fists, hands, fingers, upper and lower back, hips, and thighs. In the CG, there was no pain reduction in any body part.

The levels of agreement between judges, according to the Kappa test, both for the vowel "a" and for spontaneous speech, ranged from 50 to 70% for both groups. The intraevaluator agreement was 30% for the vowel "a" and 70% for spontaneous speech, for both groups.

The results presented in Table 2 refer to the similar judgment of at least two of the three judges for each parameter analyzed. The perceptual-auditory analysis of the vowel "a" did not present differences after LMT was applied in all of the assessed parameters of both groups. It is important to mention that, even though there are no significant differences, 55.6% of the dysphonic individuals presented a "better" global impression of voice quality after LMT. Regarding spontaneous speech, the perceptual-auditory analysis showed "worse" roughness after LMT in the DG. For the other parameters, there was no difference after LMT in both analyzed groups. It is important to mention that no differences were observed in DG in more than 70% of the sample after LMT considering the parameters roughness, tension, resonance, and articulation.

Table 3 shows the results of acoustic parameters before and after LMT. The analysis of fundamental frequency (f0) was made separately for men and women. Therefore, in DG, f0 before LMT was 209 Hz for women and 126 Hz for men, and, after LMT, f0 was 213 Hz and 127 Hz, respectively. For the CG, f0 before LMT was 212 Hz for women and 97 Hz for men, and, after LMT, 216 Hz and 100 Hz, respectively. No differences were observed between the moments pre- and postLMT in both groups and genders. As to the other parameters, it was observed that only the CG demonstrated reduced jitter values after LMT.

Table 4 reveals the sensations reported by individuals after LMT. The DG showed positive sensations regarding the larynx and the articulation. The other investigated sensations, despite not presenting significant positive perceptions, showed that most individuals reported positive sensations in these parameters after LMT. In the CG, no significant sensations were observed after LMT.

DISCUSSION

This study aimed at approaching dysphonias based on abusive vocal behavior, classified in literature as functional or organofunctoinal dysphonia[1]. These types of dysphonia may be associated with imbalance in cervical and perilaryngeal muscles, and speech-language treatment may use manual therapies associated with vocal techniques addressed to voice training, observed in clinical practice. However, this study tried to observe the immediate effects of a manual technique called LMT[11], in a single therapy session, without association with a vocal training, lasting 20 minutes. LMT is first described[11] as a massage in sternocleidomastoid muscles, going to the other muscles in the suprahyoid and laryngeal regions. Despite the different time of application, this study followed these described criteria.

This article observed reduced pain intensity on the temporal regions, larynx, posterior part of the neck, and lower and upper back after LMT in dysphonic individuals (Table 1). Pain can be present in behavioral dysphonia situations[23], once laryngeal muscles in dysphonic people are more rigid[2,11]. These results reinforce the idea that it is possible to bring back balance to muscles that are distal and proximal to the larynx by using LMT, improving blood irrigation in the applied region, making it less resistant.

Regarding the reduced pain intensity on the lower back, hips, and thighs (Table 1), it is possible to relate it to the fact that the person was sitting during LMT, and the posture was corrected by the therapist, at rest, therefore being relaxed. Maybe, this fact is not associated to the dysphonia; however, some authors in the physical therapy field consider questions related to imbalance in muscle chains[24,25]. The authors state[24,25] that body movement and postural adaptation result from the action of muscle chains constituted by gravitational muscles working in synergy in the same chain. They are characterized as a set of muscles in the same direction, usually polyarticular, with associated biomechanical function. The adequate balance

Table 1. Values, in millimeters, of the intensity of musculoskeletal pain reported by individuals in the dysphonic and in the control groups, before and after Laryngeal Manual Therapy

Pain location	Dysphonic group		p-value	Control group		p-value
	Pre LMT Mean (SD)	Post LMT Mean (SD)		Pre LMT Mean (SD)	Post LMT Mean (SD)	
Temporal region	12.7 (25.6)	5.7 (13.4)	*0.028	1.1 (3.0)	3.7 (10.9)	0.593
Masseter	11.8 (23.8)	5.1 (13.2)	0.069	10.6 (20.7)	7.0 (16.1)	0.590
Suprahyoid	8.2 (15.9)	4.5 (9.5)	0.294	0.0 (0.0)	4.8 (18.2)	1.000
Larynx	24.6 (28.4)	9.6 (16.9)	*0.026	1.4 (3.7)	1.4 (4.4)	1.000
Neck (anterior)	12.1 (21.8)	6.1 (13.2)	0.260	0.06 (0.24)	0.06 (0.24)	1.000
Neck (posterior)	17.3 (24.9)	6.4 (14.0)	*0.005	4.1 (12.9)	0.8(3.2)	1.000
Shoulders	12.2 (17.5)	6.6 (12.5)	0.086	6.1 (13.3)	1.2 (3.4)	0.138
Upper back	21.2 (25.4)	11.3 (14.4)	*0.016	3.3 (7.8)	2.2 (5.4)	0.593
Elbows	4.2 (13.5)	1.8 (5.5)	0.144	0.0 (0.0)	0.3 (1.2)	1.000
Fists/hands/fingers	9.8 (16.5)	2.8 (5.1)	*0.036	0.7 (2.7)	1.4 (3.8)	1.000
Lower back	13.7(19.7)	5.2 (9.4)	*0.008	9.6 (19.5)	4.8 (13.9)	0.068
Hip/thighs	6.1 (13.4)	3.0 (7.1)	*0.028	0.6 (2.2)	0.7 (2.4)	1.000
Knees	8 (15.8)	2.3 (6.6)	0.161	0.4 (1.4)	0.2 (0.7)	1.000
Ankles/feet	2.7 (6.2)	2.0 (6.9)	0.345	4.5 (12.7)	1.0 (2.7)	0.285

Wilcoxon Test (*p≤0.05)

Caption: LMT = Laryngeal Manual Therapy; SD = standard deviation

Table 2. Auditory-perceptual judgment regarding the best vowel emission and spontaneous speech of individuals in the dysphonic and in the control groups, before and after Laryngeal Manual Therapy

Assessed parameters	Vowel "a"						Spontaneous speech					
	Dysphonic group			Control group			Dysphonic group			Control group		
	n	%	p-value	n	%	p-value	n	%	p-value	n	%	p-value
Global impression of voice quality vocal												
Better before	6	40.0		3	20.0		7	46.6		1	6.7	
Better after	8	53.3	0.791	3	20.0	1.000	2	13.4	0.070	2	13.3	1.000
No difference	1	6.7		9	60.0		6	40.0		12	80.0	
Roughness												
Better before	2	13.4		1	6.7		8	53.3		1	6.7	
Better after	5	33.3	0.688	1	6.7	1.000	1	6.7	0.008*	2	13.3	1.000
No difference	8	53.3		13	86.6		6	40.0		12	80.0	
Soprosidade												
Better before	5	33.3		3	20.0		4	26.7		0	0	
Better after	4	26.7	0.727	1	6.7	0.625	1	6.7	0.125	0	0	1.000
No difference	6	40.0		11	73.3		10	66.6		15	100.0	
Tension												
Better before	5	33.3		1	6.7		2	13.4		0	0	
Better after	5	33.3	1.000	1	6.7	1.000	0	0	0.500	1	6.7	1.000
No difference	5	33.3		13	86.6		13	86.6		14	93.3	
Instability												
Better before	4	26.7		3	20							
Better after	4	26.7	1.000	4	27.7	1.000	NP		NP	NP		NP
No difference	7	46.6		8	53.3							
Resonance												
Better before				NA		NA	1.000	6.7	1	0	0	
Better after	NP		NP	0		0		0	0			1.000
No difference				14		93.3		15	100.0			
Articulation												
Better before				NA		NA	0	0	1	0	0	
Better after	NP		NP	0		0		0	0			1.000
No difference				15		100		15	100.0			

Signals Test (*p<0.05).

Caption: NP = nonassessed parameter

Table 3. Values of acoustic parameters, before and after Laryngeal Manual Therapy, of the individuals in the dysphonic and in the control groups

Acoustic parameters	Dysphonic group		p-value	Control group		p-value
	Pre LMT Mean (SD)	Post LMT Mean (SD)		Pre LMT Mean (SD)	Post LMT Mean (SD)	
Jitter	1.05 (0.80)	1.12 (0.78)	0.800	1.59 (1.53)	0.77 (0.67)	*0.033
Shimmer	3.13 (0.80)	3.17 (1.24)	0.845	3.92 (1.92)	3.06 (1.67)	0.098
NHR	0.12 (0.02)	0.12 (0.02)	0.783	0.12 (0.02)	0.13 (0.02)	0.566

Wilcoxon test (*p≤0.05).

Caption: NHR = noise-to-harmonics ratio; LMT = Laryngeal Manual Therapy; SD = standard deviation

Table 4. Numeric distribution of immediate sensations reported by individuals in the dysphonic and in the control groups, after Laryngeal Manual Therapy

Sensations	Voice		Larynx		Articulation		Breathing	
	Dysphonic group	Control group	Dysphonic group	Control group	Dysphonic group	Control group	Dysphonic group	Control group
Positive	10	7	10	6	7	2	3	6
No difference	2	8	3	6	8	13	10	4
Negative	3	1	2	3	0	0	2	5
p-value	0.092	0.07	*0.039	0.5	*0.016	0.5	0.092	1

Signals Test *p<0.05.

control reflects on appropriate muscle synergies and produces effective motor response, which minimize and restore the displacement of the center of gravity[24]. On the other hand, at the presence of postural changes, the body reorganizes itself in chains of compensation, searching for an adaptive response. Therefore, when there is imbalance, postural changes are established, and, in some cases, they lead to pain. So, the LMT may have contributed with the improvement of pain in the lower back, hip and thighs, even if not focused on these regions, providing improvement in the muscle chain. Further interdisciplinary studies are required to understand the effect of massage on the head and neck regions and its effects on other parts of the body, which are not in the control and study field of Speech-Language Pathology and Audiology.

Regarding voice quality, the worsened roughness of dysphonic individuals (Table 2) may be related to muscle rebalance in the perilaryngeal region achieved after LMT. Dysphonic individuals make compensatory and inadequate muscle adjustments in a scenario of hyperfunctional dysphonia[26]. These adjustments along the voice system are made to improve difficulties related to voice production, such as the presence of roughness and breathiness, in order to reach better voice quality in a vicious, repetitive, and constant cycle of muscle imbalance[11]. Probably, after LMT, the voice tension was decreased, even if not demonstrated by the auditory-perceptual evaluation of the judges, which might have led to worse roughness. On the other hand, in a study assessing the effects of one type of LMT in 25 sessions, the authors observed improved voice quality, especially regarding tension[10]. In clinical practice, usually the application of voice techniques indicated to relax laryngeal muscles may lead to worsened voice quality, making it rougher; however, they provide a softer voice, fulfilling the objective of the exercise. This fact may have happened in this study after LMT.

Regarding the acoustic analysis, LMT only changed the jitter of individuals without vocal complaints (Table 3), which indicates that LMT improved the stability in the frequency of vocal emission. It is worth to mention that, even though the jitter is correlated with auditory-perceptual characteristics of roughness and breathiness[27,28], this study did not show changes related to these parameters in the sustained vowel after LMT.

The authors who assessed the effects of LMT[11] mentioned there was no improvement in voice quality immediately after LMT, which is different from the findings of this analysis. However, they found improved acoustic parameters of jitter relative average perturbation 1 week after the LMT was conducted, which did not happen immediately after the procedure. In studies conducted with other types of laryngeal massage[10,20], the authors observed differences after the manual therapy, with improved voice quality and better jitter and shimmer parameters, which was not found in this study. On the other hand, in a study assessing the effects of 12 sessions of LMT in dysphonic women[19], no significant changes were observed in the acoustic parameters, and reported that the 20-minute LMT may have contributed with less favorable results[19]. The same may have occurred in this article, because most parameters did not show differences after 20 minutes of LMT.

One of the limitations in this study is that no evaluations were made after a period of time, for instance, one week, which would allow comparisons with other studies in literature with this control[11].

The immediate sensations regarding voice, larynx, articulation, and breathing show that, in the dysphonic group, individuals were able to see significant improvement, especially in the larynx and articulation, which did not happen in the control group (Table 4). Sensations such as “it is easier to speak”, “clearer speech”, “lighter throat”, “more relaxed”, “more loosen”, and “softer throat” show that LMT causes laryngeal comfort and relaxation, thus improving the speech articulation. Reports regarding voice, even if without statistical significance, were “cleaner voice”, “less rough”, and “softer voice.” Some negative reports were also observed regarding voice, larynx, and breathing, both in the DG and CG: “rougher voice”, “burning throat”, and “loss of breath”, indicating that not all individuals benefit from this technique, as expected. Mathieson et al.[11] also observed improvement in symptoms such as “dry throat”, “itch”, “pain”, “tightness”, and “tension in the throat” after one week of LMT; however, they reported a tendency to the recurrence of “tightness in the throat.”

There is evidence that manual therapy, in its various forms, may be useful in a primary intervention, in cases when muscle tension is present in dysphonias, even though this statement is based on a few studies[10,11,18,19]. Therefore, more controlled, randomized, and blind studies are required to understand LMT better and to investigate the role of this kind of treatment associated with other interventions, in individuals with different types of dysphonia. This is necessary because the application of massages on the head and neck is frequent in voice clinic, however, little is known about their immediate and long-term effects.

CONCLUSION

LMT could decrease the intensity of musculoskeletal pain in the following regions: temporal, larynx, posterior part of the neck, fists/hands/fingers, lower back, and hips/thighs in dysphonic individuals, which did not occur for individuals without vocal changes.

As to voice quality after LMT, the roughness parameter became worse in the dysphonic group. Besides, positive sensations were reported in the larynx and in the articulation by dysphonic individuals after LMT.

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