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Is Myofascial Release Therapy Cost-Effective When Compared With Manual Therapy to Treat Workers' Mechanical Neck Pains?

IvánRodríguez-Fuentes[a], Francisco J.De Toro[b], GustavoRodríguez-Fuentes[c], Iris M.de Oliveira[c], RosaMeijide-Faílde[b], Isaac M.Fuentes-Boquete[b]

[a] *FREMAP–Collaborative Mutual Society with the Social Security Institute No. 61, A Coruña, Spain*
[b] *Department of Medicine, University of A Coruña, Grupo de Terapia Celular y Medicina Regenerativa (TCMR-CHUAC), Instituto de Investigación Biomédica de A Coruña (INIBIC), Complexo Hospitalario Universitario de A Coruña (CHUAC), A Coruña, Spain*
[c] *Department of Functional Biology and Health Sciences, University of Vigo, HealthyFit Research Group, Instituto de Investigación Sanitaria Galicia Sur (IISGS), Pontevedra, Spain*

Abstract

Objective

The aim of this study was to do a cost-benefit analysis of myofascial release therapy (MRT) compared to manual therapy (MT) for treating occupational mechanical neck pain.

Methods

Variables regarding the outcomes of the intervention were intensity of neck pain, cervical disability, quality of life, craniovertebral angle, and ranges of cervical motion. Costs were assessed based on a social perspective using diary costs. Between-groups differences in average cost, cost-effectiveness, and cost-utility ratios were assessed using bootstrap parametric techniques. The economic cost-benefit evaluation was with regard to an experimental parallel group study design. There were 59 participants.

Results

Myofascial released therapy showed significant improvement over MT for cervical mobility (side bending, rotation, and craniovertebral angle). The total cost of MRT was approximately 20% less (−$519.81; 95% confidence interval, −$1193.67 to $100.31) than that of MT, although this was not statistically significant. Cost-effectiveness and cost-utility ratios showed that MRT could be associated with lower economic costs.

Conclusion

With probabilities of 93.9% and 95.8%, MRT seems to be cost-effective for treating mechanical neck pain without the need to add any additional cost to obtain a better clinical benefit. Consequently, we believe it could be included in the clinical practice guidelines of different Spanish health care institutions.

Key *Indexing* Terms

Cost-Benefit AnalysisNeck PainMusculoskeletal Manipulations

Introduction

Neck pain (NP) is a significant musculoskeletal disorder that can lead to high work absenteeism, genuinely low productivity, and in some cases disability.[1] Accordingly, this disorder is commonly associated with high social health and working costs. Approximately 70% of the general population will experience NP at some point in their lives, and the annual prevalence varies between 15% and 50% of the population.[2, 3, 4] This disorder tends to increase in occurrence with age, with a peak toward the sixth decade of life, and it is more common among women.[5,6]

There is a strong association between NP and previous episodes on the same lines.[6,7] Prevalence rates for this disorder are higher in the working population,[3] especially among those who carry out repetitive movements.[7] A review on the natural course of NP among workers revealed that between 60% and 80% of those workers who experienced mechanical NP continued to experience it after 1 year.[8]

The social and labor impact of NP, in addition to its associated costs, point to the need to implement effective treatments for mechanical NP. Persistent pain can be 1 of the most common complications for individuals with NP, which contributes negatively to their healing and return to work. Current evidence supports the use of manual therapies in combination with exercises to treat this kind of disorder, although systematic reviews on the subject do not show conclusive results regarding the effectiveness of this.[1,9, 10, 11] Very few studies have been undertaken to analyze the costs and benefits of common therapeutic interventions to treat NP, and there is therefore a need for more research into this aspect.[12, 13, 14]

Motivated by a growing interest in the fascial system in recent years, based on its role in integrating body structures,[15,16] we have developed an experimental parallel group study to compare the effectiveness of myofascial release therapy (MRT) with that of manual therapy (MT) in treating mechanical work-related NP.[17] In recent years, MRT has been extensively used, mostly to treat situations such as hamstring tightness, low back pain, and other muscular-related conditions.[18] In our study,[17] although the group treated with MRT had significant improvement in some of the studied variables (Social Functioning and Mental Component Summary scores on the Short-Form Health Survey 36, craniovertebral angle, right and left cervical side bending, and right and left cervical rotation), both groups had similar general results. Cost-benefit considerations for both therapies are relevant because even though neither necessarily achieves any better clinical result, 1 could prove less costly,[19] which would have positive repercussions on health care management.

Thus, an economic assessment through an experimental single-blind parallel group study was developed to evaluate the cost and benefit of MRT compared to MT for treating mechanical NP in a working sample, and to determine if the cost-effectiveness of such an intervention would justify the inclusion of MRT into the clinical practice guidelines of different Spanish health care institutions.

Methods

Design

The economic evaluation was conducted as part of an experimental single-blind parallel group study comparing MRT and MT for treating mechanical NP. The attribution and differentiation of costs between the interventions within the Parallel Group Study, in conjunction with measured outcomes of effectiveness, enabled a cost-effectiveness analysis. The clinical trial is registered on ClinicalTrials.gov with ID number NCT0238268.

Participants, Methods, and Results

The fundamental elements of the Parallel Group Study have been reported to provide context for the application of the cost-effectiveness analysis. Further details on the methods and results of the Parallel Group Study are available in a previously published article.[17]

Individuals from FREMAP (Collaborative Mutual Society with the Social Security Institute No. 61) participated in the study from January 2010 to December 2010.

The inclusion criteria were age between 18 and 65 years, mechanical NP with or without symptoms that radiated to the head or upper limbs,[20] and a score of 10% or higher on the Neck Disability Index or 2 points or more on the Visual Analog Scale of pain at initial evaluation.[2,21]

The sample-size calculation was made using Epidat 3.1 statistical software; a type I error level $\alpha = 0.05$, a statistical power of 90%, a minimal clinically significant difference of 2, and a control-group variance of 4.41 were assumed and resulted in a minimal number of 54 participants. Fifty-nine individuals with NP were randomly distributed into 2 groups according to the 2 therapeutic intervention programs compared (MRT and MT). Intervention sessions included superficial infrared thermotherapy, transcutaneous electrical nerve stimulation, and MTR or MT. The MT techniques were anterior-posterior and side shifts of the cervical spine; a muscle energy technique, involving side bending of the cervical spine; a neuromuscular technique for restricted C1/C2 rotation; inhibitive occipital distraction; and cervical stretching via postisometric relaxation for the upper trapezius, scalene, and sternocleidomastoid muscles. The MRT involved cranial base release, adjusting the relation of the rectus capitis posterior muscles to the dura mater gross release of the sternocleidomastoid muscle; release of the suprahyoid and infrahyoid muscles; and release of the retrohyoid fascia. More information about the clinical protocol is given by Rodríguez-Fuentes et al.[17]

The Parallel Group Study variables were NP assessed by the Visual Analog Scale, cervical disability assessed by the Neck Disability Index, quality of life (QoL) measured by the Short-Form Health Survey 36, active cervical range of motion, and craniovertebral angle.

Compared WITH MT, MRT seemed to be a more beneficial intervention therapy for treating mechanical NP as measured by craniovertebral angle, active cervical ranges of motion (for side bending and rotation only), and QoL (for the Mental Component Summary and Social Function dimension only). A comparative analysis of both groups showed no differences in pain or disability.[17]

Economic Analysis Procedure

After the intervention, to evaluate the cost and benefit of both therapies,[12,14,22] data were registered on the direct and indirect costs of health care assistance for the individuals treated for mechanical NP.

The economic assessment was developed based on a social approach, regardless of who would assume the economic costs of the process, analyzing whether there were clinical benefits for the patients when both techniques were compared or whether there were differences in cost for the Social Security Institute without differences in effectiveness. Data on costs are in euros.

Table 1 shows an overview of the resulting costs, by category, of the health care assistance and the cost estimates on the basis of data provided by FREMAP in collaboration with the Social Security Institute of A Coruña (Spain) (FREMAP 2011) for the year 2009.

Table 1. Costs Associated With Therapies

Category	Cost, €
Direct health care costs	
Medical appointments	
First	86.76
Subsequent	42.25
Complementary studies	
X-rays	52.52
MRI	204.44
CAT	154.61
EMG	111.31
MT session	15.72
MRT session	15.72
Medication	
Analgesic	3.51
NSAID	6.17
Muscle relaxant	3.40
Stomach lining shield	1.50
Direct non–health care costs	
Transport (/km)	0.19
Indirect costs	
Work absenteeism (/d)	45

CAT, computerized axial tomography; EMG, electromyography; MRI, magnetic resonance imaging; MRT, myofascial release therapy; MT, manual therapy; NSAID, nonsteroidal anti-inflammatory drug.

Statistical Analysis

Data were calculated using SPSS version 18.0 statistical software. Measures of central tendency and dispersion were used for the quantitative variables, whereas the qualitative variables were measured in frequencies and percentages. Analysis was done in accordance with the principle of intention to treat.

The cost-effectiveness analysis for both therapies used in the Parallel Group Study was done through nonparametric bootstrapping, as data regarding health care assistance costs commonly deviate too far from the normal distribution.[22,23] Bootstrap analysis was used to compare the intergroup average costs and the cost-benefit ratio using the average incremental cost-effectiveness indicators. Bootstrapping was used with bias-corrected and accelerated 95% confidence intervals (CI) replicated 1000 times.[19] Outcomes of samples through bootstrapping were graphically represented, which makes it possible to compare interventions on the basis of cost and effectiveness. The cost-effectiveness curve was calculated to evaluate the percentage of costs by pairs and to evaluate the outcomes when the experimental intervention was cost-effective compared to the control intervention. All this was calculated according to an additional maximum-cost ratio per additional benefit unit assumed.[12,14,24]

Results

A comparative analysis between the 2 study groups showed similar baseline clinical and sociodemographic characteristics.[17]

Use of Health Care Resources and Work Absenteeism

Table 2 shows the use of health care resources and work absenteeism resulting from the treatment of mechanical NP. The MRT group showed a decreased number of medical appointments and physiotherapy treatment sessions (mean ± standard deviation [SD] = 10.57 ± 4.65), in addition to decreased missed days of work (34.40 ± 38.28). All of this resulted in lower costs associated with the MRT group than the MT group, and a significant reduction in the number of treatment sessions when compared to MT (P = .017) was observed. It is important to highlight that the variables in the original study were assessed at the end of the 10th physiotherapy session, but those participants who still had unacceptable levels of pain and functionality continued with treatment after the 10th session. The decision whether or not to continue with the treatment rested on the medical professional (who was unaware of the intervention assignments), and it was based on the participant's functional status (pain assessment, functionality, and ability to perform working duties adequately). This fact allowed the assessment of the direct and indirect costs of both treatments.

Table 2. Use of Health Care Resources and Work Absenteeism After Intervention

	MT Group		MRT Group	
Resource	N	Cost, €	N	Cost, €
Medical appointments	6.31 ± 2.07	311.12 ± 87.54	5.33 ± 1.81	269.84 ± 76.34
Complementary studies	2.86 ± 2.12	177.33 ± 184.58	2.87 ± 2.00	209.29 ± 177.76
Physiotherapy sessions	13.59 ± 5.49	213.58 ± 86.36	10.57 ± 4.65	166.11 ± 73.11
Medication	—	12.06 ± 6.06	—	9.28 ± 6.15
Transport, km	26.28 ± 30.41	84.44 ± 109.52	29.53 ± 36.59	70.87 ± 81.87
Work absenteeism, d	35.03 ± 32.32	1284.83 ± 885.87	34.40 ± 38.28	904.50 ± 865.86

Data are given as mean ± SD.
MRT, myofascial release therapy; MT, manual therapy.

Table 3. Total Costs (€) After Intervention

Category	MT Group	MRT Group	Intergroup Change[a]
Direct health care costs	714.09 ± 301.59	652.12 ± 255.66	−61.97 (−200.02 to 71.02)
Direct non–health care costs	84.44 ± 109.52	70.87 ± 81.87	−13.57 (−66.99 to 36.96)
Total direct costs	798.53 ± 339.99	725.34 ± 283.73	−73.18 (−221.67 to 104.61)
Indirect costs	1284.83 ± 885.87	904.50 ± 865.86	−380.33 (−793.60 to 86.90)
Total costs	2083.35 ± 1144.63	1628.38 ± 1016.88	−454.98 (−1044.80 to 87.80)

Data are given as mean ± SD, except where otherwise indicated.
MRT, myofascial release therapy; MT, manual therapy.
[°]Data are given as bootstrapped mean with bias-corrected and accelerated 95% confidence interval.

Costs

Table 3 shows the costs associated with the treatments for both therapies. Direct health care costs included medical appointments, physiotherapy sessions, complementary studies, and medication. Direct non–health care costs included transport costs, and indirect costs included work absenteeism. Total costs for the MRT intervention were nearly 20% lower than those for the MT intervention, with an intergroup change of $519.81 in favor of MRT (95% CI, −$1193.67 to $100.31).

Cost-effectiveness and Cost-Benefit Analysis

Incremental cost-effectiveness indicators showed a trend in favor of MRT associated with lower economic costs and better clinical results compared to MT intervention for all the studied variables except disability and cervical extension (Table 4). Thus, the additional cost to achieve an additional benefit point regarding pain relief was €609.91 euros less for MRT than for MT.

Table 4. Cost effectiveness Ratios (€), Myofascial Release Therapy vs Manual Therapy, for Clinical Outcome Variables

Variable	Ratio
Pain[a]	−609.91 (−45 759.7 to 1178.7)
Disability	683.54 (214.8 to 478 708.3)
Functional status[a]	−689.60 (−277 760.0 to 160.1)
Emotional well-being[a]	−110.63 (−453.5 to 51.5)
General health[a]	−1014.95 (−235 957 to 525)
Craniovertebral angle[a]	−81.73 (−196.49 to 16.65)
Flexion[a]	−109.32 (−1328.2 to 21.6)
Extension	3998.28 (3713 to 245 745)
Right side bending[a]	−148.75 (−2277.6 to 535.8)
Left side bending[a]	−94.25 (−427.71 to 27.50)
Right rotation[a]	−135.37 (−5586.0 to 243.4)
Left rotation[a]	−82.46 (−416.58 to 41.11)

Data are given as bootstrapped mean with bias-corrected and accelerated 95% confidence interval.
MRT, myofascial release therapy; *MT*, manual therapy.
[a]Additional cost per unit of clinical outcome effectiveness is lower for myofascial release therapy than manual therapy.

Figure 1 shows cost-effectiveness planes for the studied variables when MRT is compared with MT. The graphical view for cervical extension was similar to those for disability (Fig 1B). For the rest of the variables, the graphical view is similar to those for pain (Fig 1A) and craniovertebral angle (Fig 1C). Most of the cost pairs and results were located in the lower right quadrant, suggesting that MRT is associated with better clinical results and lower costs in treating mechanical NP. This trend could be observed for all the studied variables except disability and cervical extension, where cost pairs and results present an approximately uniform distribution in both lower quadrants. This would indicate that although clinical differences were not observed between the therapies, MRT incurred a lower treatment cost.

In addition, cost-effectiveness acceptability curves would seem to confirm the trend in favor of MRT. If a minimum ratio of 0 is established, without any additional cost, intergroup acceptability curves show that the probability of MRT being cost-effective with respect to MT is 93.9% for QoL and 95.8% for the craniovertebral angle.

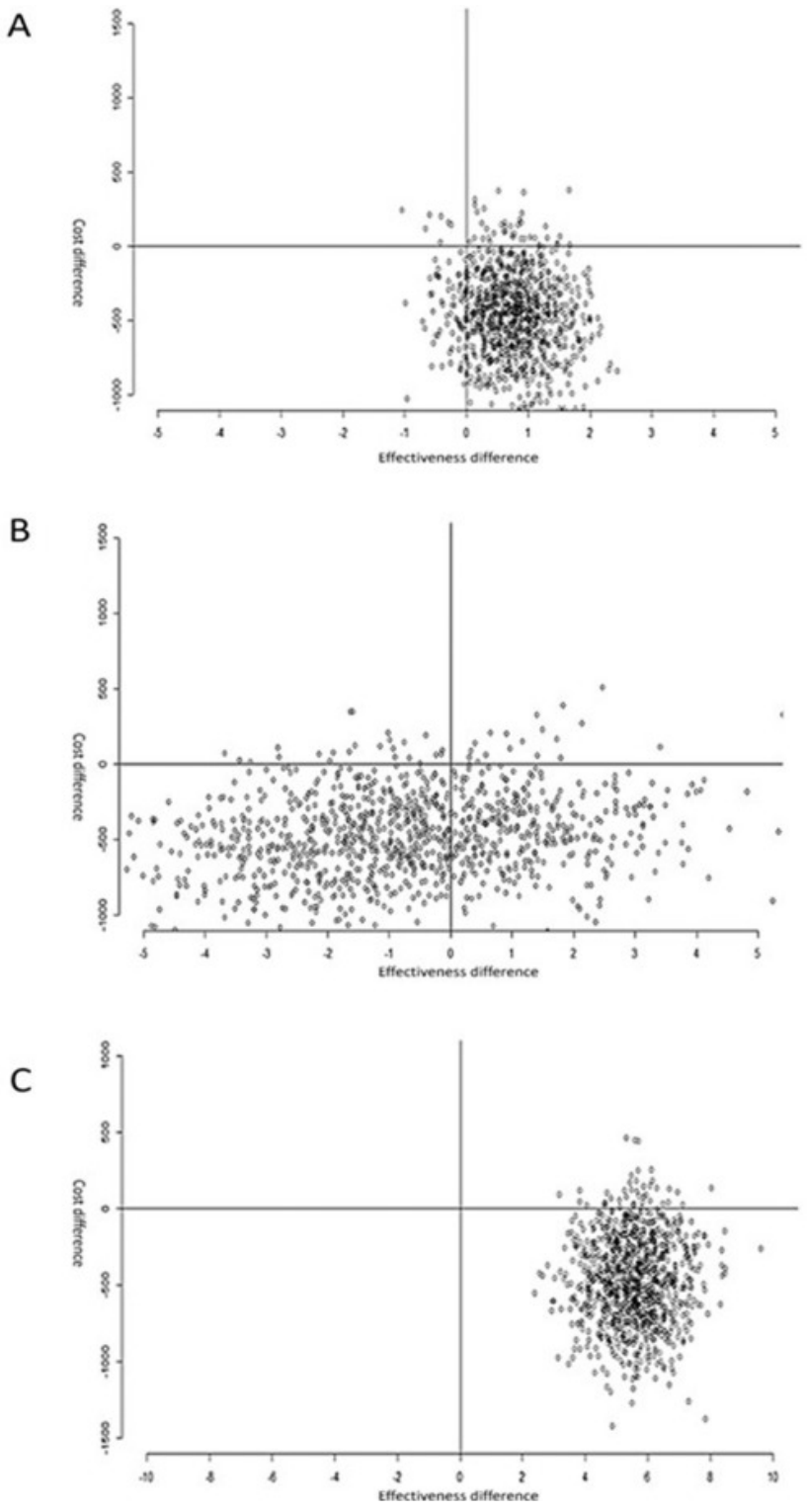

Fig 1. Cost-effectiveness plane for myofascial release therapy compared with manual therapy. Postintervention pain (A), postintervention disability (B), and postintervention craniovertebral angle (C).

Discussion

Main Findings

Although mechanical NP is a common disorder and is frequently associated with high health care and working costs, only a small number of studies have investigated this aspect,[12, 13, 14,25] and thus there is little evidence on the cost-effectiveness of therapeutic interventions to treat NP.

The significant interest shown in the fascial system in recent years has resulted in an increase in the number of studies documenting the effectiveness of MRT for pain relief and postural correction.[26, 27, 28] However, scientific evidence about the cost-effectiveness of MRT in treating working mechanical NP has not been found.

The objective of the present work was to analyze the cost-effectiveness of MRT in treating mechanical NP in a working sample compared to MT, based on the original Parallel Group Study.[17] Likewise, we thought it relevant to analyze the potential positive economic impact derived from the inclusion of such a therapeutic approach within the clinical practice guidelines of different Spanish health care institutions, such as worker insurance companies, general health care centers, and physiotherapy centers.

The use of MRT and MT appeared to be effective in individuals with working mechanical NP, although MRT seemed to be a more beneficial intervention therapy for the craniovertebral angle, active cervical ranges of motion (side bending and rotation), and QoL (Mental Component Summary and Social Function dimension).[17] In the original study, it would be expected that the favorable results regarding craniovertebral angle and active cervical ranges of motion were in line with the results regarding pain and disability. However, there were significant differences between groups in relation to vertebral cranial angle and range of motion, and no significant differences between groups were observed in relation to pain and disability, which indicates that at least in our sample, differences in range of motion or craniovertebral angle do not generate direct improvements in pain or disability. It could also be important to point out that that sample derived from a collaborative mutual society, which could mean that participants did not have the inclination to improve pain. Compared to MT, MRT achieved lower total costs, with an intergroup change of −$519.81 (95% CI, −$1193.67 to $100.31) and required significantly fewer treatment sessions ($P = .017$) and fewer missed days of work. Incremental cost-effectiveness indicators showed a trend in favor of MRT associated with lower economic costs and better clinical results for all the studied variables except disability and cervical extension. For those variables, clinical differences were not observed between the therapies, although MRT would incur a lower treatment cost.

Therefore, the cost-effectiveness analysis showed a positive trend in favor of MRT being associated with lower economic costs and better clinical results than MT, even though significant differences were not observed. The ability of any therapy to be a most cost-effective intervention could be defined as the therapy being capable of reducing the payment of a daily allowance for work absenteeism, and consequently costs would be independent of physiotherapy treatment. In our study, MRT showed significant differences in reducing physiotherapy sessions, and consequently the number of days the worker receives the daily allowance.

Comparisons With Other Studies

Korthals-de Bos et al,[12] in a study on mechanical NP, observed that manual therapy seemed more cost-effective than general physiotherapy and general medical care, with significantly lower costs and slightly better clinical outcomes. Total costs in that study were much lower than those observed in our study (manual therapy: €447; general physiotherapy: €1297; medical care: €1379). These differences could be explained by the disparity in the numbers for working absenteeism in both studies (1.3 days with manual therapy and 7.5 days with general physiotherapy in that study vs 35 days in our study), as working absenteeism represents a high percentage of total treatment costs.

Bosmans et al[14] observe that some cognitive behavioral techniques could significantly reduce pain and cervical disability compared with manual therapy. However, substantial investments would be necessary relative to manual therapy for these techniques to be cost-effective with 95% probability. For their part, Manca et al[25] compared a cognitive behavioral program with the McKenzie method and point out that although the first had lower costs (−£117; 95% CI, −£530 to 295), the additional costs of the McKenzie method (£1220) would be compensated by the additional effectiveness of such a method. Willich et al13 assessed the effect of acupuncture, added to conventional medical care, in the treatment of chronic mechanical NP and determined that assuming an additional cost of €50 per effectiveness unit, acupuncture was cost-effective with 99.5% probability.

Contrary to those studies, our results suggest that with MRT, it would not be necessary to assume any additional cost in order to obtain better clinical effectiveness than with MT. With 93.9% to 95.8% probability, MRT seems to be more cost-effective in all variables studied with no need to assume any additional cost. Even for disability and cervical extension, for which no significant clinical outcome differences were observed when both interventions were compared, MRT appears to be associated with lower treatment costs.

Morris et al[19] consider that data regarding the cost-effectiveness of different therapies might be relevant even though no significant clinical outcome differences are observed between therapeutic interventions, because although no particular intervention is more effective, 1 of them could be less costly and consequently have a positive impact on health-related expenditure. Thus, results from our study could be a relevant contribution to health care decision making and the assessment of MRT's potential inclusion in the clinical practice guidelines of Spanish health care institutions. By contrast, not developing a follow-up period in our study might limit the relevance of the results and their importance in terms of influencing health care decision making.[12,14,25]

Limitations

Other limitations that could influence any generalization of our results and could lead to caution being required in interpreting them would be the fact that MRT was applied by the same physiotherapist and that the sample was restricted to workers. New studies with a larger sample size, developed in different centers and including a long-term follow-up of the cost-effectiveness of MRT, would be needed.

Conclusion

In conclusion, this cost-effectiveness study suggests that in individuals with mechanical NP related to work, MRT appears to be more cost-effective than MT. It showed significant differences in reducing physiotherapy sessions and consequently the number of days a worker receives the daily allowance. Additionally, using MRT does not appear to assume any additional cost in order to obtain better clinical effectiveness than MT. Consequently, we believe it could be included in the clinical practice guidelines of different Spanish health care institutions.

Practical Applications

- Individuals treated with myofascial release therapy (MRT) recovered significantly faster compared to those treated with manual therapy (MT), with significant improvements in cervical range of motion.

- MRT appears to be more effective and less costly than MT in treating workers’ mechanical neck pain.

- No additional cost would be necessary to consider MRT cost-effective regarding all the studied variables relative to MT for treating workers’ mechanical neck pain.

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No funding sources or conflicts of interest were reported for this study.

Contributorship Information

Concept development (provided idea for the research): I.R.-F., F.J.D.T.

Design (planned the methods to generate the results): I.R.-F., F.J.D.T., R.M.-F., I.M.F.-B.

Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): I.R.-F., F.J.D.T., R.M.-F., I.M.F.-B.

Data collection/processing (responsible for experiments, patient management, organization, or reporting data): I.R.-F.

Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): I.R.-F., G.R.-F., I.M.O.

Literature search (performed the literature search): I.R.-F.

Writing (responsible for writing a substantive part of the manuscript): I.R.-F., G.R.-F., I.M.O.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): I.R.-F., F.J.D.T., G.R.-F., I.M.O., R.M.-F., I.M.F.-B.

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