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Intervention of manual motor skill exercises on pain and functionality in adults subjects with rheumatoid arthritis: case series

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ABSTRACT

Introduction: Rheumatoid arthritis has a significant negative impact on the ability to perform daily tasks, including work, household chores and quality of life. Experimental and clinical findings suggest that retraining of motor skills may provide improvements in patients with chronic pain the wrist and hand.

Objective: To describe the changes in the manual function, the grip strength and pain, to the sixth week and to the third month after the application of exercises focused on manual motor skills, in adults with rheumatoid arthritis.

Method: Non-experimental design study, descriptive case series, sample 17 participants with diagnosis of rheumatoid arthritis. The patients performed a program of exercises focused on manual motor skill for 6 weeks. Were measured at the variables of function, the grip strength , digtal clamp and pain, the sixth week and at the third month.

Results: There was no significant difference in pain intensity, function and the grip strength, post intervention $p > 0,05$. There was significant difference at the sixth week in the digital clamp $p = 0.002$. During follow-up at the third month, there was only significant difference in the grip strength $p = 0.01$.

Conclusion: The application of a program of exercises focused on the manual motor skill, generated changes a level of the grip strength and clamp. Regarding the functionality and intensity of pain, there were no significant differences.

Key words: Motor skills, physical therapy, chronic pain, rheumatoid arthritis.

RESUMEN

Introducción: La artritis reumatoide tiene un significativo impacto negativo en la capacidad para realizar labores diarias, incluyendo el trabajo, las tareas del hogar y la calidad de vida. Los hallazgos experimentales y clínicos sugieren que el reentrenamiento de la habilidad motora puede proporcionar mejoras en pacientes con dolor crónico de muñeca y mano.

Objetivo: Describir los cambios en la función manual, en la fuerza de puño y en el dolor, a la sexta semana y al tercer mes tras la aplicación de ejercicios enfocados en la habilidad motora manual en adultos con artritis reumatoide.

Método: Estudio de diseño no experimental, descriptivo serie de casos, muestra 17 participantes con diagnóstico de artritis reumatoide. Los pacientes realizaron un programa de ejercicios enfocados en la habilidad motora manual durante 6 semanas. Se midieron las variables de función, dolor, fuerza de puño y pinza, a la sexta semana y al tercer mes.

Resultados: No existe diferencia significativa en la intensidad del dolor, función y fuerza de puño, postintervención $p > 0,05$. Existe diferencia significativa a la sexta semana en la fuerza de pinza $p = 0,002$. Durante el seguimiento al tercer mes solo hubo diferencia significativa en la fuerza de puño $p = 0,01$.

Conclusión: La aplicación de un programa de ejercicios enfocados en la habilidad motora manual generó cambios a nivel de la fuerza de puño y pinza. Con respecto a la funcionalidad e intensidad del dolor no se apreciaron diferencias significativas.

Palabras clave: Habilidad motora manual, terapia física, dolor crónico, artritis reumatoide.

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INTRODUCTION

Rheumatoid arthritis (RA) is the most common autoimmune inflammatory arthritis in adults (1). RA has a significant impact on the inability to carry out daily tasks, including work, household chores and quality of life (2,3). 7% of patients present mild disability at 5 years from the outset of the disease's appearance, and 50% present high disability for work 10 years after the disease's appearance (4,5). Musculoskeletal functional alterations include: loss of grip strength, rigidity associated with a decrease in the range of metacarpophalangeal and interphalangeal joint movement and pain in the wrist and hand region (6).

The therapeutic interventions used and reported in the literature for this clinical condition are: acupuncture, electrotherapy, low-intensity laser therapy, therapeutic ultrasound, manual therapy, patient education, exercises with an emphasis on aerobic intensity and thermotherapy, including heat therapy, cryotherapy and balneotherapy (6). The exercises for therapeutic management of the wrist and hand region presented in the scientific literature particularly include exercises focusing on manual motor skills (7,8). These exercises include performing isometric and dynamic motor actions, which activate the stabilizing musculature of hand and wrist, encouraging normal movement (9) and grip and pinch strength (10-12). These exercises have shown to improve coactivation of stabilizing musculature of hand and wrist, to increase grip strength and to restore the normal pattern of movement that is altered in patients with this clinical condition (13-15).

Authors such as Moseley (16) and Smart (17) propose including graded motor imagery (GMI) as a treatment approach in patients with chronic upper limb pain (16), as positron emission tomography studies in patients with RA observed that blood flow in the prefrontal cortex, in the dorsolateral cortex, the anterior cingulate cortex and the frontal cingulate cortex was lower in the patients with RA in comparison with the controls exposed to pain by heat stimulus, showing changes at the level of the central nervous system (18). One way of being able to approach these central nervous changes is by means of the previously mentioned GMI. A recent review by the Cochrane Collaboration study group (17) shows that GMI and mirror therapy can provide clinically significant improvements in pain and functionality for individuals with chronic wrist and hand pain, directly affecting the neuroplastic changes occuring at central nervous level (17).

Clinical and experimental findings suggest that retraining motor skills, as well as cognitive skills, should be carried out with a limited number of series and/or repetitions, in such a way as to mitigate fatigue and pain, in order to optimize the result of rehabilitating patients with chronic musculoskeletal pain (19-21).

Although it is true that the documented exercises generating coactivation of stabilizing musculature of the hand have been proposed for traumatic pathologies of the wrist and carpus region (7), they are essentially based on the fact that by specific, coordinated activation of the wrist's extensor and flexor muscles, it is possible to improve the hand's stability and functionality (7,22).

There currently exist 4 clinical practice guides focusing on managing patients with RA (23-26), two of them specific to physical therapy (24,25), providing recommendations in relation to the type and dose of physical agents to apply, such as the application of electrotherapy, thermotherapy or cryotherapy (24). The also describe the type and intensity of aerobic exercise or the manual therapy technique that should be used (25). However, they do not mention any treatment containing specific exercises for retraining the coactivation of flexor and extensor musculature responsible for hand and wrist stability and control and. Neither do they mention GMI as an intervention tool for subjects with RA, particularly when these patients show neurophysiological alterations in accordance with the dysfunction of central nervous system mechanisms (27), both in processing and in executing movement patterns (28,29) and the final development of motor skills, found in subjects with chronic pain of musculoskeletal origin (27-30).

Based on the antecedents mentioned above, our investigation posed the question: in adults with rheumatoid arthritis who are set to receive a six-week kinetic therapy consisting of a program of exercises focused on manual motor skills, will they show better function, greater grip strength and less pain intensity? Accordingly, our objective is to describe the changes in manual function, in grip strength and in pain intensity, subsequent to kinetic therapy with exercises focusing on manual motor skills in adults with rheumatoid arthritis.

METHOD

This study is framed within a quantitative approach, with a descriptive, case-series design. Regarding the small sample and design, we could mention the following aspects: the fact that the sample is small does not directly affect the validity of the study's results because it is a descriptive, case-series study, so there exists no direct calculation of sample size and the inclusion of subjects follows random, non-probabilistic sampling.

Sample

This case series was carried out in the kinesiology laboratory of the Universidad de las Américas, located in Manuel

Montt 948, Providencia, Santiago, during the period from March to December 2016. The sample was made up of 17 women aged above 40 years old, with a mean age of 68.4, from the Corporación Volar Chile at the Santiago central offices, with a medical diagnosis of rheumatoid arthritis of the hand. The sample was obtained non-probabilistically, as it followed the order of patients obtained from the corporation. All subjects included in the study accepted and signed their informed consent. All participants presented 5 years' evolution of the disease, with a DAS28 score of between 5.2 and 6.2. Structural damage could not be objectified by means of imaging study, for example using the tool SENS, as most of the patients belonging to the corporation did not physically have the x-rays during the period when the investigation was carried out. The participants did not present wrist or hand joint inflammation, were undergoing pharmacological treatment with methotrexate 8 to 12 milligrams (MG) administered once a week, plus ketoprofen 150 to 200 mg daily. Pharmacological treatment remained stable for the whole period when the study was carried out. Each dose was independent for each participant and was prescribed by the rheumatologist of the health-care service the participant attended to control and treat their condition.

Inclusion criteria

- Adult subjects above 40 years old belonging to the Corporación Volar Chile.
- Subjects with medical and imaging diagnosis of rheumatoid arthritis of the hand.
- Subjects that are not currently receiving kinetic treatment.

Exclusion criteria

- Subject with a recent (<6 months) fracture of the wrist or hand.
- Subjects that have recently (<6 months) received surgical treatment of the wrist or hand.
- Subject with peripheral neurological alterations.

Measurement of results

The dependent variables were: a) manual function, registered by means of the Health Assessment Questionnaire (HAQ) (31); b) grip strength, evaluated with a Jamar dynamometer (Jamar TM Hidraulic Hand Dynamometer Preston, Jackson, Missouri., U.S.A.); c) pinch strength, between the index finger and thumb (Jamar TM Hidraulic Hand Dynamometer, Preston, Jackson, Missouri, U.S.A.) (32-35), and d) pain intensity, quantified by means of the Visual Analog Scale (VAS) (36-38).

The independent variable is the intervention of a 6-week kinetic program, focused on manual motor skills. 3 exercises were carried out: the first to maintain or increase grip strength, the second to exercise control and fine motor skills, and the third using mirror therapy.

Intervention

Manual pressure control

The patient sat with their feet on the floor and with their forearm and hand resting on a table. The upper limb was in a neutral pronation/supination position and holding a twice-folded sphygmomanometer inflated to 20mmHg (Lansbury method) (34,35,39). After this, the patient was asked to squeeze the sphygmomanometer with their fist for 5 seconds and then release it slowly. In the first and second week, the sphygmomanometer was inflated to 20 mmHg and the patient exerted manual pressure taking the gauge to 30 mmHg; in the third and fourth week, the sphygmomanometer was inflated to 30 mmHg, and the patient exerted manual pressure taking the gauge to 40 mmHg. In the fifth and sixth week, the sphygmomanometer was inflated to 40 mmHg, and the patient exerted manual pressure taking the gauge to 50 mmHg (34,35). All patients carried out 3 series of 10 repetitions with their able hand, resting between each series (Figure 1).

Inverted dart exercise

Each patient was seated, with their feet on the floor, their elbow bent between 70º and 90° and resting on a table. The hand and forearm were in neutral pronation/supination position and holding a clothes peg between the thumb and index finger pads, simulating opposition, without overloading the distal interphalangeal joint of the index finger towards extension and with pressure from the first dorsal interosseous. The other fingers remained extended. Next, an extension was made, with maximum wrist ulnarization, ending in a flexion with maximum wrist radicalization (39,40). All patients carried out 3 series of 10 repetitions, resting between series (Figure 2).

Mirror therapy

All the patients carried out the protocol proposed by Ramachandra et al. (41,42), with a mirror 35 cm long by 25 cm high, located on the table in front of each patient

and positioned between both upper limbs. The mirror was placed to reflect the able hand, so the patient viewed all the exercises through the mirror, the actions consisted of intransitive movements, such as pronation, supination, flexion, extension, radicalization, ulnarization and opposition of the thumb with each finger of the hand. 3 series of 10 repetitions were made. It is worth noting that they were active movements of wrist and hand and transitive movements that required handling objects (such as piling 9 wooden blocks [7 cm long by 2 cm wide and 1 cm high, Jenga type] in 3 repetitions) and turning over plastic cards (commercial entity-type debit cards) (42). 3 series of 10 repetitions were made, respectively (Figure 3).

Measurement of variables

All measurements of results (manual function, grip strength, pinch strength and pain) were recorded before the intervention, at six weeks, which was the term of intervention, and at the third month. Measurements of the results mentioned were recorded by a professional from outside the study with over 10 years' clinical experience in rheumatology.

Measurements of primary results

Manual function was evaluated through the Health Assessment Questionnaire (HAQ) (31, 43), which is the specific instrument most used and recommended for evaluating functional status in patients with RA (31). The HAQ is a self-applied questionnaire of 20 items that evaluate the degree of self-perceived physical difficulty in carrying out 20 everyday activities comprised in 8 areas: a) dressing and grooming (2 articles); b) arising (2); c) eating (3); d) walking (2); e) personal hygiene (3); f) reach (2); g) grip (3), and h) other activities (3). Each item is scored from 0 to 3 according to the following scale: 0 = without difficulty, 1 = with some difficulty, 2 = with much difficulty, 3 = unable to do so. The final HAQ score is an average of the 8 areas, so it ranges between 0 (no disability) and 3 (maxim disability) (31).

Measurements of secondary results

A Jamar® dynamometer (Lafayette Hydraulic Hand Dynamometer, Model J00105) was used to evaluate of grip strength (44). Measurements were carried out according

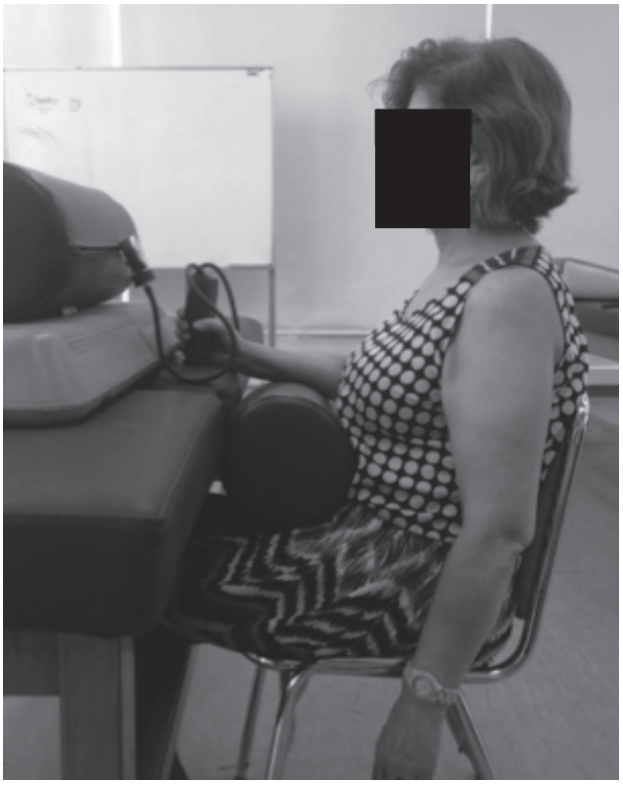

Fig. 1. Manual pressure exercise with sphygmomanometer.

Fig. 2. Inverted dart exercise.

Fig. 3. Mirror therapy exercises.

to the recommendations of the American Society of Hand Therapists (45). Patients were evaluated while seated, with their arm beside their body, shoulders in a neutral position, elbow bent at 90° and forearm in neutral rotation. Subsequently, they were verbally instructed to make a fist with the greatest possible force, holding it for 4 seconds and then resting for 30 seconds between each attempt. The able side was evaluated. The highest value obtained from 3 attempts was recorded (46). An adjustment of 6% difference was made between the strength of the dominant side and non-dominant side (47). The final result was expressed as a percentage with regard to the unaffected side.

To measure pinch strength, the lateral pinch approach was used; the position was similar to the one adopted when measuring fist grip strength, although with a greater degree of cubital inclination from 15º to 20°, holding the pinch dynamometer suspended in the air, without any kind of support and exerting pressure with the thumb pad on the side face of the middle phalanx of the index finger (44,46).

To evaluate pain intensity, the visual analog scale (VAS) was used, which consists of a 10 cm-long horizontal line: the left end represents 0 or "without pain" and the right end represents 10 or "the worst pain imaginable", for evaluating pain intensity. Each patient was asked to draw vertical line that indicated the magnitude of the pain experienced at the time of evaluation. This simple and easily-reproduced, one-dimensional evaluation method is recommended for inclusion in the evaluation of all patients with wrist and hand pathologies (48,49).

Statistical analysis

Data was compiled and entered into Excel software for tabulation. Statistical analysis was subsequently carried out using the IBM SPSS statistics 32 software for Windows. Quantitative variables are presented as median and standard deviation, and qualitative variables as number and percentage. To determine the statistical tests to be used, the first analysis evaluated normal distribution using the Shapiro-Wilk test. Differences were examined in total HAQ score, grip strength, and VAS prior to treatment, at 6 weeks and at the third month. Because 3 evaluations were carried out, ANOVA or the Friedman test used was for dependent samples. One-way ANOVA was used with repeated measurements for the difference before treatment, at 6 weeks and at three months, with time as an independent variable, and for the specific difference among the 3 evolution periods, the Bonferroni correction was used, establishing a P-value significance of <0.05.

RESULTS

The results of baseline characteristics are presented in Table I. Patient age ranged between 46 and 83 years old, with an average of 68.4. 100% of the sample was women. All were had been undergoing treatment with methotrexate for 5 years: doses varied in each patient and ranged between 7.5 and 25 mg per week. As regards dominance, all were right-handed. With respect to complications associated with the intervention, in the third week of treatment 2 patients reported more intense pain, although they did not require a visit to the rheumatologist to evaluate their condition. At the 3-month follow-up, no patient reported complications associated with the intervention received.

The assumption of normality was analyzed and rejected for the variables of VAS follow-up at the third month, pre-intervention functionality, post-intervention functionality, functionality at the third month follow-up and pre-intervention pinch strength, so the nonparametric Friedman test was used to make the comparison. Pre-intervention VAS score, post-intervention VAS score, pre-intervention grip strength, post-intervention grip strength, grip strength at the third month follow-up, post-intervention pinch strength and pinch strength at the third month of follow-up showed normality in their distribution, so the ANOVA test was used. For the specific difference among the 3 periods of evolution the Bonferroni test was used (Table II).

Functionality

In functionality prior to intervention, average HAQ was 1.7 (SD 0.4). At the sixth week it was 1.6 (SD 0.5) and at the third month it was 1.6 (SD 0.5). There were no statistically significant differences $p = 0.2$ (Figure 4). Participants, on completing the HAQ questionnaire at the sixth week and the third month, recorded the options they carried out daily, although the questionnaire does not measure a sin-

gle improved quality, and is somewhat broad as regards function. For example, pinch strength could be deduced from questions 15, 16 and 17, as all participants traveled daily using public transport and did not carry out actions to open and close automobile doors, so as the questionnaire score prescribes, the highest value should be assigned.

Grip strength

Average grip strength prior to intervention was 17.5 kg (SD 7,8), at the sixth week it was 17.5 kg (SD 8,2), and at the third month it was 33.3 kg (SD 16,9); there were statistically significant differences p = 0.01 (Figure 5).

Pinch strength

Average pinch strength prior to intervention was 2.7 kg (SD 1,8),aAt the sixth week it was 6.5 kg (SD 2) and at the third month it was 6.7 kg (SD 2,4); there were statistically significant differences p = 0.002 (Figures 6). As regards grip and pinch strength, each patient was consulted which daily, recreational or other activity they performed from the sixth week (which was when the study concluded) until the third month when the follow-up was carried out and final registration of the results measured. All the participants said that they continued carrying out the first 2 exercises by personal choice, as they found greater wrist and hand mobility and less feeling of rigidity during the period when the study lasted. The commented that as the intervention consisted of three parts where the first consisted of manual pressure exercises, even though they did not have their own Sphygmomanometer, they carried out the pressure exercises at home using a rubber ball, a tennis ball or a lemon.

The second exercise, the inverted dart, proposed by Dr. Marc García-Elías using a clothes peg, as this tool is easy to access and very common among the general population, was also carried out periodically. Participants reported that they carried out these 2 exercises daily from Monday to Friday, and execution time ranged between 20 and 30 minutes a day. With regard to mirror therapy, they did not carry it out due to lack of instrumentation, as they had to have a mirror 35 cm long by 25 cm high with its respective 3 silicone supports to hold the mirror upright, plus the 9 wooden blocks to pile up and plastic cards to turn over.

Thanks to this registration by means of clinical interview by the investigators, we consider that grip strength and pinch strength increased due to this explanation in relation to the pain variable. Although it shows a decrease of 4.1 cm at the third month compared with 5.2 at the sixth week, this was not statistically significant. The main explanation to support

TABLE I
DEMOGRAPHIC ANALYSIS OF THE SAMPLE

Sample size	*Age*	*Sex*
14	68,4	14 women

TABLE II
ANALYSIS OF VARIABLE NORMALITY

Variable	*P-Value*
Pre-intervention pain intensity	0,08*
Post-intervention pain intensity	0,33*
Pain intensity at 3-month follow-up	0,05
Pre-intervention functionality	0
Post-intervention functionality	0
Functionality at 3-month follow-up	0
Pre-intervention grip strength	0,27*
Post-intervention grip strength	0,67*
Grip strength at 3-month follow-up	0,11*
Pre-intervention pinch strength	0,05
Post-intervention pinch strength	0,95*
Pinch strength at 3-month follow-up	0,19*

*Data that shows normal distribution.

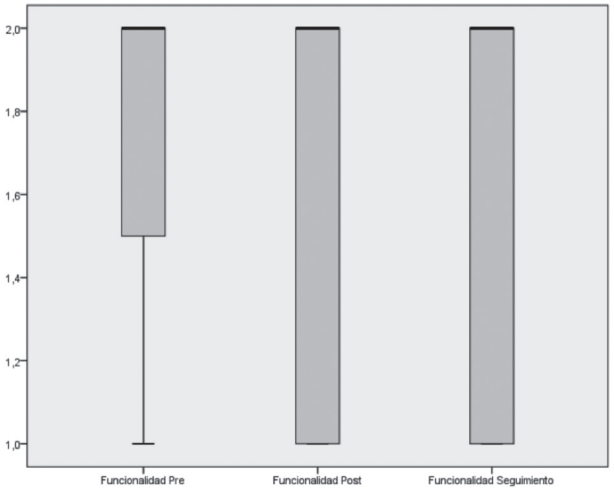

Fig. 4. Functionality score according to HAQ, pre-intervention, at six weeks and at three months from applying the exercise program.

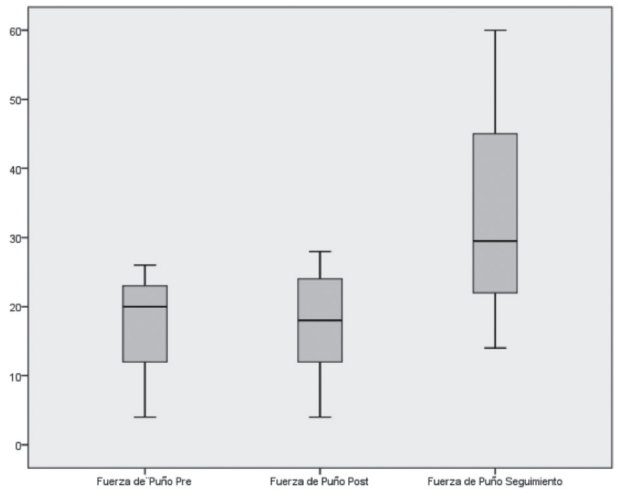

Fig. 5. Grip strength score evaluated in kg, pre-intervention, at six weeks and at three months from applying the exercise program.

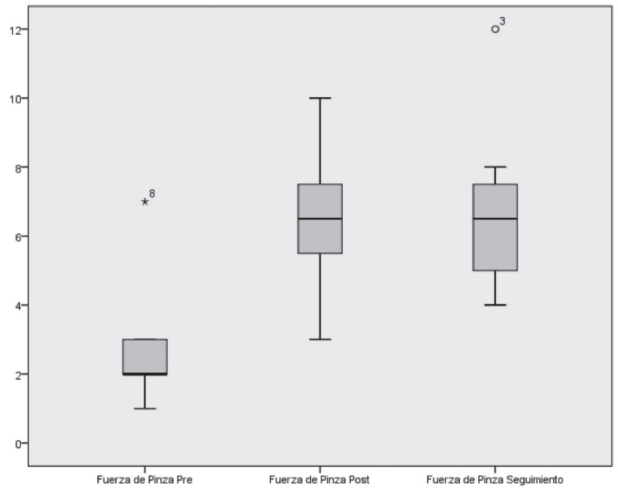

Fig. 6. Pinch strength score evaluated in kg, pre-intervention, at six weeks and at three months from applying the exercise program.

this result is that participants did not carry out mirror therapy, while there exists sound basis for its inclusion in pain treatment for patients with a ghost limb and chronic pain and, as it documented by the literature, mirror therapy focuses on pain management or modulation through the mirror neuron system, which are a special type of neurons that process information sequentially to produce motor movement, increasing the affected segment's cortical representation and, in this case, visualizing painless hand movement.

Pain

Average pain intensity prior to intervention was 4.2 cm (SD 1.7), at the sixth week it was 5.2 cm (SD 1.6) and at the third month it was 4.1 cm (SD 2.1). There were no statistically significant differences p =0.4 (Figure 7).

Discussion

This study carried out an intervention on 17 women from the Corporación Volar Chile, above 40 years old, diagnosed with rheumatoid arthritis of the hand, without any type of current kinetic treatment, and who complied with the inclusion and exclusion criteria mentioned above. Participants were treated in an EHM program (35,39,40,42,50), starting with grip strength through a sphygmomanometer (35,39,44-47), continuing with a motor control action with the inverted dart exercise (39,40,50) and concluding with mirror therapy, which consists of transitive movements (such as turning over cards and piling wooden blocks) and intransitive movements (such as wrist flexion-extension, wrist ulnarization-radicalization, forearm pronation-supination, and finger opposition by way of mirror therapy, using a mirror angled towards the able hand [41,42]). Baseline data recorded prior to the exercise program's intervention. Level of functionality evaluated with the HAQ was 1.75 (SD 0.46), grip strength with the dynamometer was 17.5 kg (SD 7.84), pinch strength with the pinch dynamometer was 2.75 kg (SD 1.83). As regards dominance, all were right-handed. Pain intensity was 4.25 centimeters (SD 1,75) on the VAS. Upon concluding the exercise program at the sixth week, the data measured found the following: level of functionality with the HAQ was 1.62 (SD 0.52), grip strength was 17.5 kg (SD 8.26), pinch strength was 6.5 kg (SD 2.07) and pain intensity was 5.25 (SD 1,67) cm on the VAS. During the follow-up at the third month, data showed an HAQ of 1.62 (SD 0.52), grip strength of 33.37kg (SD 16.96), pinch strength of 6.75kg (SD 2.49), VAS of 4.12 (SD 2.17) cm.

As regards the program's development, three participants dropped out. In the third week of treatment, 2 patients reported greater pain, although they did not require a visit to the rheumatologist. The periodicity of sessions was twice a week, with a total exercise program duration of six weeks.

Although this study's intended objective was not to conduct a cost analysis, sessions had an average duration between 45 and 50 minutes. We believe this aspect of cost-effectiveness should be considered in later studies.

On reviewing the literature on exercises recommended for kinetic treatment of rheumatoid arthritis, the systematic reviews of Moseley et al. (27-30) reported slight to moderate evidence regarding low-intensity exercises compared

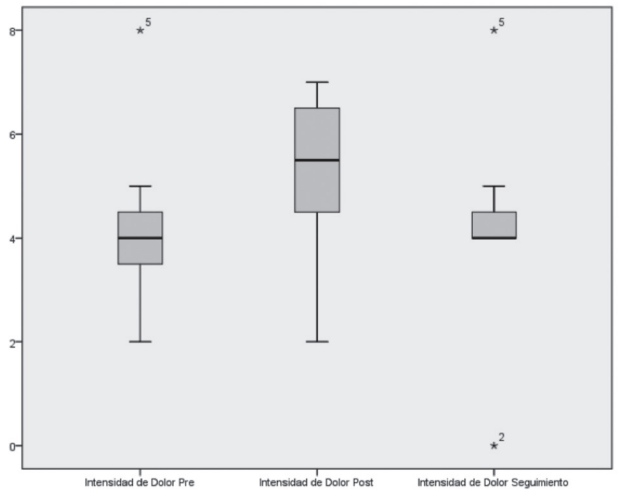

Fig. 7. Pain intensity score evaluated in cm, pre-intervention, at six weeks and at three months from applying the exercise program.

with high-intensity exercises in users with rheumatoid arthritis in an inactive phase. Additionally, the extended case reviews of Van den Ende et al. (35,39,40,42,50) strongly recommend low-intensity exercises to improve strength and pain in inactive phases.

The results show that the median values of functionality, unlike in the case of pain intensity, decreased: where at the outset of the exercise program there was an HAQ score of 1.75 (SD 0.46), on concluding the program the score was 1.62 (SD 0.52), and at follow-up it was 1.62 (SD 0.52), so there exists no statistically significant difference.

With respect to grip and pinch strength, something interesting occurred. As for grip strength with dynamometrics in kg, the median at the outset of the program was 17.5 kg (SD 7,84), and on concluding the program it remained at 17.5 kg (SD 8.26), without any statistically significant difference. However, at follow-up it increased to 33.37 (SD 16.96), which was statistically significant between pre-intervention and follow-up times, as well as between the sixth week and the third month. As regards pinch strength with dynamometrics in kg, at the outset of the exercise program it registered 2.75 kg (SD 1.83), and on concluding was 6.5 kg (SD 2,07), so there existed a statistically significant difference between the start of the program and the sixth week. However, the follow-up registered 6.75 (SD 2.49), so there was no statistically significant difference; this shows that the improved level of pinch strength remained constant subsequent to the exercise program. We should highlight that the increased strength following the exercise program could be due to the low-intensity exercises, which other authors also suggest (50-52). Furthermore, the maintained grip strength achieved at the sixth week, and the increased pinch strength during follow-up, may be attributed to the fact that, as all participants mentioned, they continued carrying out the exercises proposed in this exercise program at home, on their own. As regards pain intensity, despite the fact that when the exercise program ended it increased from 4.25 (SD 1.75) to 5.25 (SD 1.67) cm on the VAS, it was not statistically significant and, subsequently, during follow-up, the pain remained stable with 4.12 (SD 2.17) cm on the VAS. Therefore, no statistically significant differences exist as regards decreased pain in a low-intensity exercise program (35,39,40,42,50-52).

The results presented are in line with those presented in the literature (27-30,35,39,40,42,50-52), where it may be seen that carrying out a low-intensity exercise program statistically significantly increase grip and pinch strength, but no statistically significant difference exists as regards pain intensity and functionality, respectively.

However, there exist at least two methodological aspects that differentiate this descriptive study from other clinical studies published. The first is its design, as this study does not include a control group, nor randomization and nor does it compares low-intensity and high-intensity exercises (35,39,40,42,50,51); the second is that, to the extent we can deduce, other studies carry out their low-intensity exercise programs on different types of patient, with different clinical conditions and symptoms, as is the case of ghost limbs or CVA (27-30), which could give rise to bias and affect clinical applicability. Some studies leave the open door to using low-intensity exercises in different pathologies to study their effectiveness and tolerance (35,39,40,42,50). Consequently, it is relevant to comply with the inclusion and exclusion criteria mentioned above, because if the sample studied does not correspond to the same clinical condition, and the same applies to different diagnoses, it could affect the final conclusions.

Finally, we should note that no conflict of interest exists regarding the investigators, and the implementation of this study caused neither damage nor adverse effects to the individuals of the population studied.

CONCLUSION

No statistically significant differences exist in changes in manual function, nor in pain intensity, by applying a kinetic intervention program with exercises focusing on manual motor skills in adults with rheumatoid arthritis. A statistically significant difference does appear in grip and pinch strength upon concluding the intervention and at follow-up. It is suggested that new investigations be carried out, using other study designs, in order check its effectiveness on pain and functionality in this patient group.

CONFLICT OF INTEREST

The authors declare they have not received any type of financing for carrying out this study.

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