

## **„EFEKTI PRIMJENE FIZIOTERAPIJE KOD PACIJENATA S ANKILOZANTNIM SPONDILITISOM U INSTITUTU IGALO**

### **Sažetak**

**UVOD:** U Institutu za fizikalnu medicinu, rehabilitaciju i reumatologiju “Dr Simo Milošević” u Igalu kroz 40 godina proveden je državni program Vlade Norveške. Program se provodio od travnja do sredine listopada. U ovom radu će se prikazati rezultati primjene fizioterapijskih vještina u održavanju i povećanju mobilnosti kralježnice kod bolesnika s anki- lozantnim spondilitisom. U radu će se pokazati mobilnost kralježnice koristeći standardizirani mjerni postupak lateralne fleksije koji se u potpunosti primjenjuje od strane fizioterapeuta.

**MATERIJALI I METODE:** Dvadeset i pet (25) fizioterapeuta uključeno je u terapiju vježbom u drugoj fazi Instituta Igalu te su primjenom metode mjerenja centimetarom mjerena kretanja laterofleksije trupa u 57 bolesnika (32 muškaraca ili 56,1% i žene i 25 ili 43,9%), prije početka rehabilitacije i nakon primjene terapijskih postupaka. U prvoj skupini, od 25. travnja do 23. svibnja 2016. godine bilo je 21 ispitanika (13 muškaraca i 8 žena), dok je u drugoj skupini od 23. svibnja do 20. lipnja 2016. godine bilo je 36 sudionika (19 muškaraca i 17 žena). Prosječna dob prve skupine bila je 60,80 godina, dok je prosječna starost u drugoj skupini bila 53,36 godina. Prosječna dob u obje skupine bila je 58 godina.

**REZULTATI:** Nakon terapijskih postupaka prosječno povećanje mobilnosti lateralne fleksije kralježnice na desnoj strani iznosilo je 4,72 cm, dok je prosječno povećanje mobilnosti lateralne fleksije kralježnice na lijevoj strani iznosilo je 4,94 cm. Rezultati primjene T-testom za zavisni uzoraka pokazali su da je rehabilitacija dovela do značajnog poboljšanja mobilnosti lateralne fleksije ( $p = 0,006$  za desnu stranu,  $p = 0,002$  za lijevu stranu). Wilcoxonov test također pokazuje značajne promjene u mjerama pokretljivosti u lateralnoj fleksiji trupa nakon rehabilitacije u odnosu na mjere prije rehabilitacije: za desnu stranu  $Z = -2,791$ ,  $p = 0,005$ ; za lijevu stranu  $Z = -3,136$ ,  $p = 0,002$ .

**ZAKLJUČAK:** Rezultati ovog istraživanja pokazuju da je za održavanje, a posebno za povećanu mobilnost kralježnice kod bolesnika s anki- lozantni spondilitis, potrebno primijeniti različite tehnike i vještine fizioterapeuta. Dugogodišnja tradicija uspješnog liječenja raznih oblika reumatoidnog artritisa stavlja Institut Igalu u prepoznatljivi multidisciplinarni rehabilitacijski centar u Europi.

**KLJUČNE RIJEČI:** lateralna fleksija, anki- lozantni spondilitis, fizioterapija

# EFFECTS OF PHYSIOTHERAPY IN PATIENTS WITH ANKYLOSING SPONDYLITIS AT THE IGALO INSTITUTE

KRSTO KOVACEVIC, ALEKSANDRA SAVIC

Institute for Physical Medicine, Rehabilitation and Rheumatology "Dr Simo Milosevic" JSC IGALO

## Abstract

**INTRODUCTION:** At the Institute for Physical Medicine, Rehabilitation and Rheumatology "Dr Simo Milosevic" in Igalo for 40 years the State program of the Government of Norway has been implemented. The program has been implemented from April to mid-October. In this paper we are going to show the results of the application of physiotherapy skills in maintaining and increasing the mobility of the spine in patients with ankylosing spondylitis. The paper will show the mobility of the trunk using the standardized measurement method of lateral flexion fully applied by the physiotherapist.

**MATERIALS AND METHODS:** Twenty-five (25) physiotherapists employed in exercise therapy in the second phase of the Institute Igalo have been applying the method of measuring centimeter tape movement lateral flexion of the trunk in 57 patients (32 men or 56.1% and women and 25 or 43.9%) before the start of rehabilitation and after application of therapeutic procedures. In the first group, from April 25 to May 23, 2016 there were 21 participants (13 men and 8 women), while in the second group from May 23, to June 20, 2016 there were 36 participants (19 men and 17 women). The average age of the first group was 60.80 years, while the average age of the second group was 53.36 years. The average age in both groups was 58 years.

**RESULTS:** After therapeutic procedures the average increase mobility lateral flexion of the trunk to the right amounted to 4.72 cm, while the average increase mobility lateral flexion of the trunk to the left amounted to 4.94 cm. The results of the application of the T-test for paired samples showed that rehabilitation led to a significant improvement in mobility in lateral angle ( $p = 0.006$  for the lateral right,  $p = 0.002$  for the lateral left). Wilcoxon signed rank test also showed a significant change in measures of mobility in lateral flexion of the trunk after rehabilitation in relation to the measures before rehabilitation: for the lateral right  $Z = -2.791$ ,  $p = 0.005$ ; for the lateral left  $Z = -3.136$ ,  $p = 0.002$ .

**CONCLUSION:** Results from this study indicate that for maintenance and especially for the increased mobility of

the spine in the area of the body in patients with ankylosing spondylitis, the successfully applied various techniques and skills by physiotherapists of the Institute Igalo are important. The long tradition of successful treatment of various forms of rheumatoid arthritis puts Institute Igalo in distinctive multi-disciplinary rehabilitation centers in Europe.

**KEY WORDS:** lateral flexion, ankylosing spondylitis, physiotherapy

## Introduction

At the Institute for Physical Medicine, Rehabilitation and Rheumatology "Dr. Simo Milosevic" in Igalo for 40 years the State program of the Government of Norway has been implemented. The program is implemented from April to mid-October. This paper show the results of the application of physiotherapy skills in maintaining and increasing the mobility of the spine in patients with ankylosing spondylitis. This paper show the mobility of the spine using the standardized measurement method of lateral flexion fully applied by the physiotherapist (1).

Ankylosing spondylitis is a chronic, inflammatory rheumatic disease, the signs of which were found during archaeological excavations in the ancient Egyptian mummy 5,000 years old. The first report on the pathological changes of the skeleton was revealed in 1691 by Bernard O'Connor, while a correct diagnosis was made possible only at the end of the 19th century, when the appropriate descriptions of the disease was given by the neurophysiologist Vladimir Behterev in Russia in 1893, Adolf Strimpel in Germany in 1897 and Pierre Marie in France in 1898. The disease after several years ends with the ossification of the connective structure and ankylosis of the joints, which significantly reduces the mobility and daily activities are difficult to perform (2).

The range of motion in joints affected by inflammatory process is reduced, the spine looks like a bamboo cane, walking, bending, position changes are more difficult to make, and some movements are almost impossible. Muscles lose their flexibility and elasticity. Rigid chest breathing occurs, changing the posture and the physiological curve of the spine is straightened.

An important aspect of treatment represents physiotherapy, which can reduce pain and stiffness and improve the general condition of the patient. Exercise therapy is especially recommended. It has been shown that regular exercise practice is most essential for the treatment of this disease. It should be tailored for each patient, the exercises should be made every day, once or twice a day for 15 to 20 minutes. Given the tendency of reduced mobility exercises will increase mobility of the onset of the disease and educate patients that exercise is an integral part of life. The goal of these exercises is to preserve the proper attitude, especially the pelvis, as well as stimulating the work of certain joints, particularly the shoulders and hips (3).

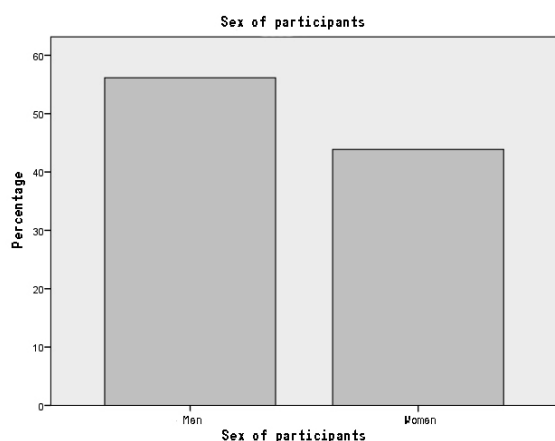
There are different interventions for the treatment of reduced mobility. The most commonly used exercises to increase mobility are stretching and mobilization of joints (4). Thermal procedures are used as an introduction to the practice (5). This paper will show the importance of flexibility, preservation of the range of motion and application of stretching exercises, the efficiency which is seen in treating these patients for many years at the Institute for Physical Medicine, Rehabilitation and Rheumatology "Dr Simo Milosevic" in Igalo.

## Materials and Methods

Twenty-five (25) physiotherapists employed in exercise therapy in the second phase of the Institute Igalo have applied a method of measuring centimeter tape movement lateral flexion of the trunk in 57 patients (32 men and 56.1% women and 25 or 43.9%) (Chart 1) before the beginning of rehabilitation and after the application of therapeutic procedures. In the first group, from April 25, to May 23, 2016 there were 21 participants (13 men and 8 women), while in the second group from May 23, to June 20, 2016 there were 36 participants (19 men and 17 women). The average age of the first group was 60.80 years, while the average age of the second group was 53.36 years old. The average age in both groups was 58 years.

**Chart 1 – Sex of participants**

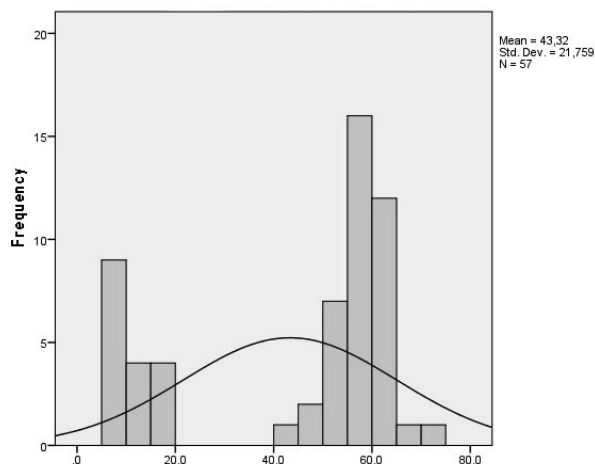
Age of participants - ranging from 27 to 79 years; the arithmetic mean of  $x = 56.11$ ,  $SD = 11.15$ ;



## Results

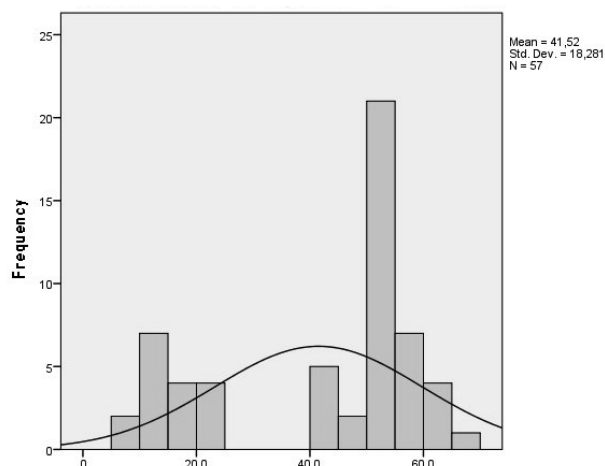
Lateral flexion to the right side on admission (before rehabilitation) measures the value ranged from 5.0 to 72.0 cm; the arithmetic mean of  $x = 43.32$ ,  $SD = 21.76$ ; Median 55.00. (Chart 2).

**Chart 2 – Lateral flexion to the right before rehabilitation**



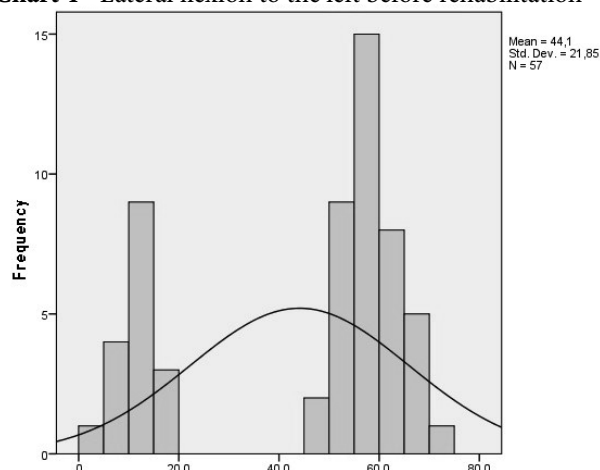
Lateral flexion to the right after rehabilitation: 6.0 to 65.0 cm; the arithmetic mean of  $x = 41.52$ ,  $SD = 18.28$ ; Median 51.00. (Chart 3)

**Chart 3 - Lateral flexion to the right after rehabilitation**



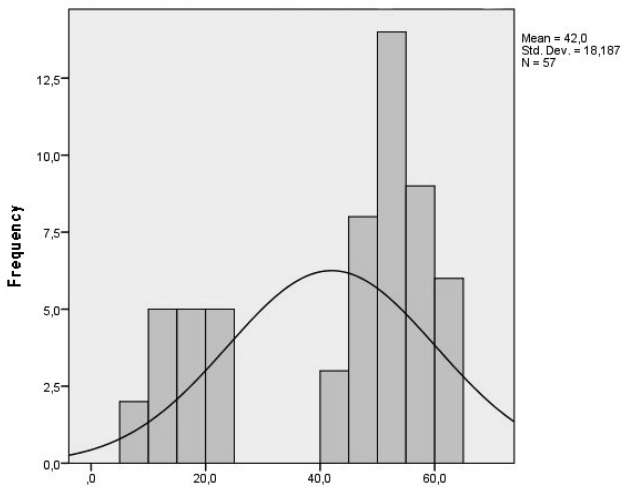
Lateral flexion to the left on admission (before rehabilitation) measures the value ranged from 4.0 to 70.0 cm; the arithmetic mean of  $x = 44.10$ ,  $SD = 21.85$ ; Median 55.00. (Chart 4)

**Chart 4 - Lateral flexion to the left before rehabilitation**



Lateral flexion to the left after rehabilitation: 8.0 to 63.0 cm; the arithmetic mean of  $x = 42.00$ ,  $SD = 18.19$ ; Median 50.00. (Chart 5)

**Chart 5** - Lateral flexion to the left after rehabilitation



Testing the normality of distribution measurement data

Shapiro-Wilk value for the measured value of the test (after rehabilitation) for all four variables is 0.000 (less than 0.05), which means that the data of all four variable deviate significantly from the normal distribution.

The significance of the difference of the measured values in lateral mobility of the trunk after rehabilitation in relation to the value of the rehabilitation T-test for paired samples (Paired samples t-test) (Table 1)

	Paired Differences				t	df	Sig. (2-tailed)	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower				Upper
Lateral flexion to the right before rehabilitation – Lateral flexion to the right after rehabilitation	1,7982	4,7225	,6255	,5452	3,0513	2,875	56	,006
Lateral flexion to the left before rehabilitation – Lateral flexion to the left after rehabilitation	2,0965	4,9375	,6540	,7864	3,4066	3,206	56	,002

Lateral flexion to the right increased by  $x = 1.80$ ,  $SD = 4.72$  ( $x = 43.32$ ,  $SD = 21.76$  to  $x = 41.52$ ,  $SD = 18.28$ ), lateral flexion to the left is increased by  $x = 2.10$ ,  $SD = 4.94$  ( $x = 44.10$ ,  $SD = 21.85$  to  $x = 42.00$ ,  $SD = 18.19$ ).

The results of the application of the T-test for paired samples showed that rehabilitation led to a significant

improvement in mobility in lateral angle ( $p = 0.006$  for the lateral right,  $p = 0.002$  for the lateral left).

The nonparametric test for the assessment of the significance of difference measurements after rehabilitation compared to the measurements before rehabilitation - Wilcoxon Signed Ranks Test

Wilcoxon signed rank test also showed a significant change in measures of mobility in lateral flexion of the trunk after rehabilitation in relation to the measures before rehabilitation: for the lateral right  $Z = -2.791$ ,  $p = 0.005$ ; for the lateral left  $Z = -3,136$ ,  $p = 0.002$ .

## Conclusion

Results from this study indicate that for maintenance and especially for increasing the mobility of the spine in the area of the body in patients with ankylosing spondylitis, the successfully applied various techniques and skills by physiotherapists are important. The long tradition of successful treatment of various forms of rheumatoid arthritis puts Institute Igalo in one of the most distinctive multi-disciplinary rehabilitation centers in Europe.

**ATTACHMENTS:** Measurements and various techniques and skills applied by physiotherapists.



**Figure 1** Measurement, starting position



**Figure 2** Measurement, second position



Figure 3 Exercise 1



Figure 4 Exercise 2



Figure 5 Exercise 3



Figure 6 Exercise 4



Figure 7 Exercise 5



Figure 8 Exercise 6



Figure 9 Exercise 7



Figure 10 Exercise 8



Figure 11 Individual kinesiotherapy



Figure 12 Individual kinesiotherapy



Figure 13 Morning programme



Figure 14 Morning programme



Figure 15 Breathing exercises



Figure 16 Breathing exercises



Figure 17 Individual hidrokinestiotherapy



Figure 18 Group hidrokinestiotherapy



Figure 19 Group hidrokinestiotherapy



Figure 20 Group kinesiotherapy



Figure 21 Tai Chi



Figure 22 Yoga



Figure 23 Successful therapy / „You should be here” #igalospa

REFERENCES:

1. Donnelly S, Mejia A, Denton A, Doyle DV. Which measures of ankylosing spondylitis best determine outcome? *Br J Rheum* 1994; 33:27.7.
2. Durigl T, Vitulić V. *Reumatologija*, Ljubljana. Jugoslovenska medicinska naklada, 1982. 33-65.
3. Mihajlović V. *Fizikalna terapija*. Rijeka Crnojevića: Obodsko slovo, 2002.
4. David C, Lloyd J. *Rheumatological Physiotherapy*. London: Mosby 1999.
5. Altan L, Brugol U, Aslan M, Yurtkuran M. The effects of balneotherapy on patients with ankylosing spndylitis. *Scandinavian Journal of Rheumatology* 2006, 35-283-9. <http://comms.informahealthcare.com>