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CASE STUDY

Effect of Therapeutic Exercise on Symptomatic Cervical Spondylosis: A Case Study

Efecto del Ejercicio Terapéutico en la Espondilosis Cervical Sintomática: Estudio de un Caso

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ABSTRACT

Cervical spondylosis (C.S.) is a degenerative disorder in the neck that is very common and worsens with age; it limits the ability to do regular activity and is costly to treat. The purpose of the present case report is to describe the outcome of the physical therapy treatment, emphasizing therapeutic exercises for a patient with C.P. A 55-year-old man attended the yoga lab because his cervical spine was straightened, tingling, numbness on the left thumb, index and middle fingers, and upper limb numbness. The subject was treated with therapeutic exercises. The patient was evaluated for sixty days before and after the therapeutic exercises' treatment. Investigation and evaluation were done with an MRI of the Cervical spine and an X-ray of the Cervical Spine A.P. and lat with Flexion and Extension. The result showed a very significant improvement, likely cured.

Keywords: Therapeutic Exercises; Straightened Neck; Cervical Spondylosis.

RESUMEN

La espondilosis cervical (EC) es un trastorno degenerativo del cuello muy frecuente que empeora con la edad; limita la capacidad de realizar una actividad regular y su tratamiento es costoso. El propósito del presente informe de caso es describir el resultado del tratamiento de fisioterapia, haciendo hincapié en los ejercicios terapéuticos para un paciente con C.P. Un hombre de 55 años acudió al laboratorio de yoga porque tenía la columna cervical enderezada, hormigueo, entumecimiento en los dedos pulgar, índice y corazón izquierdos y entumecimiento de las extremidades superiores. El sujeto fue tratado con ejercicios terapéuticos. El paciente fue evaluado durante sesenta días antes y después del tratamiento con ejercicios terapéuticos. La investigación y la evaluación se realizaron con una resonancia magnética de la columna cervical y una radiografía de la columna cervical A.P. y lat con flexión y extensión. El resultado mostró una mejoría muy significativa, probablemente curada.

Palabras clave: Ejercicios Terapéuticos; Cuello Enderezado; Espondilosis Cervical.

INTRODUCTION

Cervical spondylosis (C.S.) is caused by the narrowing of the cervical spinal canal due to degenerative and congenital changes.[1,2,3] A prospective study found that 23,6 % of 585 patients with tetra paresis or paraparesis admitted to a regional neuroscience center had cervical spondylotic myelopathy (CSM).[4,5,6] Its cause is divided

into two categories: 1) static, including congenital stenosis and degenerative diseases, and 2) dynamic, due to mechanical abnormalities of the cervical spine.[7]

There is no consensus treatment regarding mild and moderate forms of C.S. without rapid progression of symptoms. Although surgical decompression is a prominent method for spinal cord stenosis, there is not enough data to determine that surgery is the most indicated intervention for mild forms.[8] Prospective clinical trials comparing conservative treatment and surgery have not found significant differences in up to 10 years of follow-up.[9] In both groups, patients get better and worse. In these studies, the conservative treatment is to employ a cervical collar and rest, non-steroidal anti-inflammatory drugs, the avoidance of cervical manipulation techniques (thrust), and vigorous physical activities.[8,9] However, the author's knowledge and understanding that there was no actual physical therapy treatment for symptomatic cervical spondylosis (SCS). Therefore, this study aims to describe the outcomes of the therapeutic[1,2] exercise treatment in patients with SCS.

SECTION SNIPPETS

Case Description

A 55-year-old male patient (99 kg, 1,78 m) attended the Yoga Lab because of neck pain radiating to the left upper limbs that had begun three years earlier (see figure 1). The patient reported numbness of the upper limb (left) Index finger, middle finger, and thumb with weakness. The provisional Diagnosis was PIVD (Prolapsed Inter Vertebral Disc) between C5-C6 and C6-C7 @ Cervical Spondylosis.[10]

Figure 1. Patient Description

Specific Tests

The patient was assessed with MIR Cervical Spine: the study protocol was Spin Echo T1 and Fast Spin Echo T2W high-resolution. Sagittal cervical spine images were obtained on a dedicated surface coil using 1,5 Tesla high gradient systems and correlated with T1W and T2W axial images.[11,12,13]

The finding of the test:

- Cervical lordosis was lost. Minimal posterior displacement of CV6 over CV7.[11,14,15,16]
- Anterior and posterior osteophytes were seen from the C4-C7vertebra.
- Bright signal acquires on T1W/T2W images from the endplate region of vertebral bodies of C5, C6, and C7 vertebra; Modic type II changes.
- IV disc at multiple levels was reduced in signal intensity on T2W images with loss of height at C5-6 and C6-7 levels.
- Transaxialimages show disc osteophyte complex at C3-4 level compressing the anterior epidural space and no significant nerve root compression.
- The disc osteophyte complex at the C4-5 level compresses the anterior epidural space and intends the respective nerve roots.
- The disc osteophyte complex at the C5-6 (R>L) level compresses the anterior epidural space and intends the respective nerve roots.
- The disc osteophyte complex at the C6-7 level compresses the anterior epidural space and intends the respective nerve roots.
- Ligamentum flavum hypertrophy at C6-7 with secondary canal compromise. AP canal dimension was 9,4 mm.[13,17,18]
- Rests of vertebral bodies were regular in height and signal intensity.

Doctors Advised to have Spine Surgery

Treatment

Based on different reviews, it was found that there was no better surgical treatment than the author's

choice of therapeutic exercise treatment.[19]

The following training protocol was adopted for the treatment, shown in tables 1,2,3.

Table 1. Training Schedule for Therapeutic Exercises Protocol for 1st 20 Days, based on the FITT Principle

Frequency	Intensity		Time	Type
Frequency of Stimulus	Intensity of Stimulus	Density of Stimulus (rest)	Duration of Stimulus	Yogic practice
			60 sec	Meditation
Six days	16 sec. × 3 times =48 sec.	4×2= 8 sec.	48+12=60 sec.	Nadanusandhana practices AUM
Yogic breathing exercise (pranayama)				
Six days	2 sec. (puraka) +4sec. (kumbhaka+6 second (Rechaka) =12 x 5 times=60 sec.	3 sec. X5 times =15second	60+15=75 sec.	Chandrabedana
Six days	2 sec. (puraka) +4sec. (kumbhaka+6 second (Rechaka) =12 x 5 times=60 sec.	3 sec. X5 times =15second	60+15=75 sec	Suryabedana
Yogic sukshmavayam				
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec = 48sec.	4 seconds × 3 (times rest) =12 second	(48+12) sec. 60 sec	Trataka: Eye exercises (Upward, and downward)
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec =48sec.	4 seconds × 3 (times rest) =12 second	(48+12) sec. =60 sec. One minute	Trataka: Eye exercises, Diagonal
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec =48sec.	4 seconds × 3 (times rest) =12 second	(48+12) sec. =60 sec. One minute	Trataka: Eye exercises, Horizontal
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec =48sec.	4 seconds × 3 (times rest) =12 second	(48+12) sec. =60 sec.	Trataka: Eye exercises, Eye rotation
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec =48sec.	4 seconds × 3 (times rest) =12 second	(48+12) sec. =60 sec.	Kapolashakti-vardhaka (for the cheeks); Mouth open widely
Six days	1× 10 sec.=10 sec. (Expansion) + 2 sec. (hold)=2 × 10 (repetition)=20 1× 10 sec.=10 sec (reverse) 10 +20+10=40	2seconds × 10(times rest) =20 second	40+20 =60 sec. One minute .	Anguli- shakti vikasaka (for the fingers),
Six days	14 sec. 2 ×2=4 repetition ×14=56 sec	1seconds × 4(times rest) =4 second	56 +4 =60 sec. One minute	Grivashakti-vikasaka Neck
	5 sec. 5×2=10 repetition× 5=50 sec.	1 seconds × 10 (times rest) =10 second	50 +10=60 sec.	Purnabhujashaktivikasaka (for the arms), arm rotation with flex elbow,finger touched on the shoulder joint
Six days	5 sec. 5×2=10 repetition× 5=50 sec.	1 seconds × 10 (times rest) =10 second	50 +10 60 sec.	Skandha-tatha-bahu-mulashakti-vikasaka (for the shoulders),arms straight
Specific exercises for strengthening of muscle, nerve, and bone				
Six days	2 sec. (up) +4sec. (hold)+6 second (down) =12× 5(rep)=48 sec. 48×2=96 sec	3 sec. × 5 times =15 second	96+15 =111 sec.	Butterfly exercise of folded knees
	Ten seconds (upward hold) + 10 sec. (downward hold) + 10 sec. (Movement) =30 sec Six repetitions 6 ×30 sec =180 sec	2 seconds × 5 (times rest) =10 second	180+10=190 sec.	Cat breathing exercise

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Six days	Ten seconds (upward hold) + 10 sec. (downward hold) +. 10 sec. Movement) =30 sec Six repetitions 6 ×30 sec =180 sec	2 seconds × 5 (times rest) =10 second	180+10=190 sec.	Horse breathing exercise With straightening of the leg
Six days	Ten seconds (upward hold) + 10 sec. (downward hold) +. 10 sec. Movement) =30 sec Six repetition 6 ×30 sec =180 sec	2 seconds × 5 (times rest) =10 second	180+10=190 sec.	Dog breathing exercise With body drag towards the back
Six days	10 seconds (movement) + 2 sec. (hold)=12 12×12(Round)=144 sec. 144 ×4 (Repetition)= 576 se.	5 seconds × 3(times rest) =15 sec.	576 + 15 sec =591 sec	Surya Namaskar
Six days			7 minutes	Relaxation Technique (Savasana) For recovery of Body
Six days			2 minutes	Meditation
Total time: 43 minutes 7 sec				

Table 2. Training Schedule for Therapeutic Exercises Protocol for 2nd 20 Days, based on the FITT Principle

Frequency	**Intensity**		**Time**	**Type**
Frequency of Stimulus	**Intensity of Stimulus**	**Density of Stimulus (rest)**	**Duration of Stimulus**	**Practices**
			1 minute	Meditation
Six days	16 sec. × 3 times =48 sec.	4×2= 8 sec.	48+8=56 sec.	Nadanusandhana practices AUM
Yogic breathing exercise (pranayama)				
6 days	2 sec. (puraka) +4sec. (kumbhaka+6 second (Rechaka) =12 x 8 times=96 sec.	3 sec. +7times =10 second	96+10 = 106 sec.	Chandrabedana
6 days	2 sec. (puraka) +4sec. (kumbhaka+6 second (Rechaka) =12 x 8 times=96 sec.	3 sec. +7times =10 second	96+10 = 106 sec.	Suryabedana
Yogic sukshmavayam-related exercises				
Six days	12 sec. (hold)=12 sec. Six times (repetition) =24× 6 sec =84 sec.	4 seconds × 5 (times rest) =20 sec	84 +20 sec =104 sec.	Trataka: Eye exercises (Upward, Downward)
Six days	12 sec. (hold)=12 sec. Six times (repetition) =24× 6 sec =84 sec.	4 seconds × 5 (times rest) =20 sec	84 +20 sec =104 sec.	Trataka: Eye exercises diagonal
Six days	12 sec. (hold)=12 sec. Six times (repetition) =24× 6 sec =84 sec.	4 seconds × 5 (times rest) =20 sec	84 +20 sec =104 sec.	Trataka: Eye exercises horizontal
Six days	12 sec. (hold)=12 sec. Six times (repetition) =24× 6 sec =84 sec.	4 seconds × 5 (times rest) =20 sec	84 +20 sec =104 sec.	Trataka: Eye exercises eye rotation
Six days	12 sec. (hold)=12 sec. Four times (repetition) =12× 4 sec =48sec.	4 seconds × 3 (times rest) =12 second	48+12 sec =60 sec.	Kapolashakti-vardhaka (for the cheeks);
Six days	Ten sec.=10 sec. (Expansion) + 10 sec. (hold)=20 × 12 (repetition)=240	1seconds × 11(times rest) =11 second	240+11 =251	Anguli- shakti vikasaka (for the fingers)
6 days	8 sec. 8 ×2=16 repetition 16×8=128 sec	1seconds ×14 (times rest) =14 sec	128 +14 second =142 x4=568 sec.	Grivashakti-vikasaka in four types (Neck)

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Six days	6 sec. 8×2=16 repetition× 6 =96 sec.	1 seconds × 14 (times rest) =14 second	96 sec +14 second =110 sec	Purnabhujashaktivikasaka (for the arms), arm rotation with flex elbow, finger touched on the shoulder joint
Six days	6 sec. 8×2=16 repetition×6 =96 sec.	1 seconds × 14 (times rest) =14 second	96 sec +14 second =110 sec	Skandha-tatha-bahu-mulashakti-vikasaka (for the shoulders), arms straight
Specific exercises for strengthening of muscles, nerves, and bone				
Six days	2 sec. (up) +4sec. (hold)+6 second (down) =12× 8 times=96 sec.	3 sec. × 7 times =21 second	96 +21sec. 117 sec.	Butterfly exercise of folded knees
Six days	Twelve seconds (upward hold) + 12 sec. (downward hold) + 12 sec. (movement) =36 sec 8 ×36=288 sec	1 seconds × 7 (times rest) =7 sec.	288 +7 295 sec.	Cat breathing exercise
Six days	Twelve seconds (upward hold) + 12 sec. (downward hold) +. 12 sec. movement) =36 sec 8 ×36=288 sec	1 seconds × 7 (times rest) =7 sec.	288 +7 295 sec.	Horse breathing exercise With straightening of the leg
Six days	Twelve seconds (upward hold) + 12 sec. (downward hold) +. 12 sec. movement) =36 sec 8 ×36=288 sec	1 seconds × 7 (times rest) =7 sec.	288 +7 295 sec.	Dog breathing exercise With body drag towards the back
Six days	10 seconds (movement) + 4 sec. (hold)=14 ×12(Round)=144 sec. 144 ×6 (Repetition)= 864 sec.	5 seconds × 5(times rest) =25 sec.	864+ 25 sec =889	Surya Namaskar
			12 minutes	Deep Relaxation Technique (Savasana) For recovery of Body
			5 minutes	Meditation
Total time : 1 hour 19 minutes.				

Table 3. Training Schedule for Therapeutic Exercises Protocol for 3rd 20 days, based on the FITT Principle

Frequency	**Intensity**		**Time**	**Type**
Frequency of Stimulus	**Intensity of Stimulus**	**Density of Stimulus (rest)**	**Duration of Stimulus**	**Practices**
			1 minute	Meditation
Six days	16 sec. × 3 times =48 sec.	4×2= 8 sec.	48+8=56 sec.	Nadanusandhana practices AUM
Yogic breathing exercise (pranayama)				
6 days	2 sec. (puraka) +4sec. (kumbhaka+6 second (Rechaka) =12 x10 times=120 sec.	3 sec. x9 times =27 sec.	120 +27 = 147sec.	Nadishodana pranayama
Exercises based on yogic sukshmavayam				
Six days	12 sec. (hold)=12 sec. Six times (repetition) =24× 6 sec =144 sec.	4 seconds × 5 (times rest) =20 sec.	144 +20 sec =164 sec.	Trataka: Eye exercises, eye rotation
	12 sec. (hold)=12 sec. Six times (repetition) =12× 6 sec =72 sec.	4 seconds ×5 (times rest) =20 sec.	72+20 sec =92 sec.	Kapolashakti-vardhaka (for the cheeks)

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Six days	12 sec.=12 sec. (Expansion) + 12 sec. (hold)=24 × 12 (repetition)=288 sec	1seconds × 11(times rest) =11 second	288+11=299	Anguli- shakti vikasaka (for the fingers)
6 days	6 sec. 10×2=20 repetition 20×6=120 sec	1seconds × 9 (times rest) =9 sec.	120 +9 second =129x4 =516 sec	Grivashakti-vikasaka Neck in four different types
6 days	6 sec. 10×2=20 repetition× 6=120 sec.	1 seconds × 9 (times rest) =9 sec.	120 sec +9 second =129 sec	Purnabhujashaktivikasaka (for the arms), arm rotation with flex elbow, finger touched on the shoulder joint
Six days	6 sec. 10×2=20 repetition× 6 =120 sec.	1 seconds × 9 (times rest) =9 sec.	120 sec +9 second =129 sec	Skandha-tatha-bahu-mulashakti-vikasaka (for the shoulders), arms straight
Specific exercises for strengthening of muscles, nerves, and bone				
Six days	Ten seconds (upward hold) + 10 sec. (downward hold)+ 10sec. movement) =30 sec 12×2=20 repetition ×30=600 sec	1 seconds × 11 (times rest) =11second	600 +11= 611 sec.	Butterfly exercise of folded knees
Six days	Ten seconds (upward hold) + 10 sec. (downward hold) +. 10sec. movement) =30 sec 12×2=20 repetition ×30=600 sec	1 seconds × 11 (times rest) =11second	600 +11= 611 sec.	Cat breathing exercise
Six days	Ten seconds (upward hold) + 10 sec. (downward hold) +10sec. (movement) =30sec 12×2=20 repetition ×30=600 sec	1 seconds × 11 (times rest) =11second	600 +11= 611 sec.	Horse breathing exercise With straightening of the leg
Six days	Ten seconds (upward hold) + 10 sec. (downward hold) +10sec. movement) =30 sec 12×2=20 repetition ×30=600 sec	1 seconds × 11 (times rest) =11second	600 +11= 611 sec.	Dog breathing exercise With body drag towards the back
Six days	10 seconds (movement) + 4 sec. (hold)=14 ×12(Round)=168 sec. 168 ×12 (Repetition)= 2016sec.	5 seconds × 11 (times rest) =55 sec	2016+ 55 sec =2071 Sec.	Surya Namaskar
			5 minutes	Deep Relaxation Technique (Savasana) For recovery of Body
			5 minutes	Meditation
Total time: 41 minutes				

After sixty days of therapeutic exercises, the patient was found to be better filled as usual and did lab tests. The Ray Cervical Spine A.P. &Lat with Flexion and Extension; reported as follows:

- Mild narrowing of C6-7-disc space saw.
- The vertebral body's height and its cortical outline were average.
- Intervertebral disc spaces were normal.
- No evidence of bony erosion/sclerosis was seen.
- General vertebral bone density was normal.
- No evidence of any anterior and posterior displacement was seen.
- Pedicles, articular process, and posterior spinous process were normal and
- Prevertebral and paravertebral soft tissues were normal.

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Panels of specialized doctors appreciated the result that without surgery, such improvement was made.

RESULTS

Following treatment, the patient exhibited an improvement in functional capacity, at the highest improvement, as indicated by the MIR and X-ray results. The patient could perform all movements of the spine like an average individual.

DISCUSSION

In the present case report, therapeutic exercise treatment achieved satisfactory results in a patient with Symptomatic Cervical Spondylosis.[12,13] Fortunately, a complete reduction in symptoms were achieved. Also, all post-test results of Biochemistry via HbA1C, Lipid Profile, Kidney Function test, Liver function test, and ultrasonography of the whole abdomen were closer to average values than the pre-test.

CONCLUSIONS

The present paper reported a case of symptomatic cervical spondylosis treated with therapeutic exercises and recommended further similar treatment with emphasis on manual therapy and therapeutic exercise.[3] Based on the lack of rapid evolution of neurological impairment and surgery, therapeutic exercise treatment was indicated, which achieved satisfactory results.

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The author declares that there is no conflict of interest in the work.

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