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"DESIGNING AND TESTING OF SPINAL WELLNESS PROGRAM FOR HEALTHY INDIVIDUAL - AN INTERVENTIONAL STUDY"

Yashpal Gohil[1], Priyanshu V. Rathod[2]

Abstract

Background: Human physical structure changes with age along with lifestyle. The changes are constant and irreversible to some extent. The spine is one of the most common structures which changes and leads to changes in other structures. Any kind of adverse changes in spinal structure compromises the proximal stability and mobility which further comprise the distal stability as well as mobility. Certain physical changes like tightness, stiffness, or weakness as well as functional limitations are not recognized until pain and discomfort overcome the ADLs. Spinal wellness should be taken into consideration from early aging with prediction, prevention, and personalization. Thus we would like to develop a comprehensive program for assessing and managing the normality of spinal structure under the spinal wellness program**. AIMS:** To find out the efficacy of the spinal Wellness Program on healthy individuals. **METHODOLOGY:**30 subjects were selected based on the physical assessment such as joint Range of Motion (ROMs), Manual Muscle Testing (MMT), the curvature of the spine, and v-sit & reach test and spine functional index under functional assessment. A subject-specific spinal wellness program was given for two weeks to assess the effect**. RESULT:** All the statistical analysis was done by SPSS 25. An intergroup analysis for comparing the difference between pre and post was done by using an independent sample t-test. In the pre-assessment, we found that normal subjects have a lack of range of motion and strength in the spine. after the program, we saw significant changes in the physical as well as functional outcomes. **CONCLUSION**: In context to result and discussion spinal wellness programs must be taken into consideration in the early age of life within the lifestyle modification to prevent spine-related disease and disorders such a comprehensive spinal wellness program can be prescribed to the community for health and wellness.

KEYWORDS: Spine Wellness, Stretching, Strengthening, Spine Deformity, Physiotherapy, Rehabilitation

INTRODUCTION

The human body is driven through physical and functional activity. Activity has an impact on lifestyle. Technological advances are increasing the number of three physically inactive lifestyles. Lack of exercise is considered a health risk factor and is often associated with the development of degenerative diseases such as hypertension, obesity, and spinal disease.

The present scenario on lifestyle is persons are doing fewer activities and using more gadgets its call sedentary lifestyle and sedentary lifestyle has an impact on person's postural health of the body and its give impact on the structure of the body like bones and muscles due to faulty adaptation of postures it gives more impact on the spinal health of the human body. The spine is an integral part of human mechanics because it has natural curvature that provides the body stability and mobility. Kyphosis is a condition in which the natural curves of the spine are unnaturally high. it can occur as a result of poor posture, while lordosis might develop as a result of an enlarged lumbar curve. A subject with enhanced lumbar lordosis has weak and stretched abdominal muscles, whereas the spine's erector muscles and hip flexor muscles should be shortened. During relaxed standing, these lumbopelvic imbalances should cause an increased lumbar lordosis and an enhanced anterior tilt of the pelvis.[1-3]

Malalignment of the spinal structure affects posture and causes a variety of spinal disorders such as back pain, neck pain, scoliosis, and kyphosis. Back pain and disability are associated with lack of exercise and affect about 80% of the adult population at some point in life. In some cases, this painful condition can be severe and chronic, so an exercise program as a non-pharmacological treatment to improve spinal stability and mobility, thereby reducing back pain and disability. [4-6]

Physical treatments aim to enhance function and stop disability from getting worse, Active strategies like exercise are associated with decreased disability. Passive methods (rest, medications) are related to worsening disability and aren't recommended. Public health programs should educate the general public on the prevention of low back pain and neck pain. The goal of this research is to help the community stay healthy and understand the value of back-related health and awareness activities. [14-23]

A spinal wellness program is a program to assess and maintain the physical and functional alignment of the spine among people without any pain, which incorporates stretching and strengthening to make sure normal structural stability and functional mobility. Wellness is a concept at the forefront of health promotion. The structure of this program is aimed at promoting health and identifying and correcting spinal problems.

Need of the study

physical changes like tightness, stiffness, or weakness as well as functional limitations are not recognized until pain and discomfort overcome the ADLs. Spinal wellness should be taken into consideration from early aging with prediction, prevention, and personalization. Thus we would like to develop a comprehensive program for assessing and managing the normality of spinal structure under the spinal wellness program

Materials and methodology - Materials to be used (a)bubble inclinometer, (b) goniometer (c) measure tape

Methodology

study design: an interventional study

study setting: community-dwelling,

study population: healthy individual

study sample: purposive sampling

Study duration:3 months

sample size: 30

venue for data collection: Rajkot city

CRITERIA FOR SELECTION

Inclusive criteria: age between 20 to 55 years**,** SF 36 health questionnaire **Exclusion criteria:** history of hospitalization in the last six months**,** history of the spinal implant**,** Presence of history of having severe pain

Intervention:

Mode: Stretching and Strengthening

Frequency:1 session/day, 6 days/week, 2 weeks.

Intensity: Stretching 30 sec hold, strengthening 40- 60% of 10RM

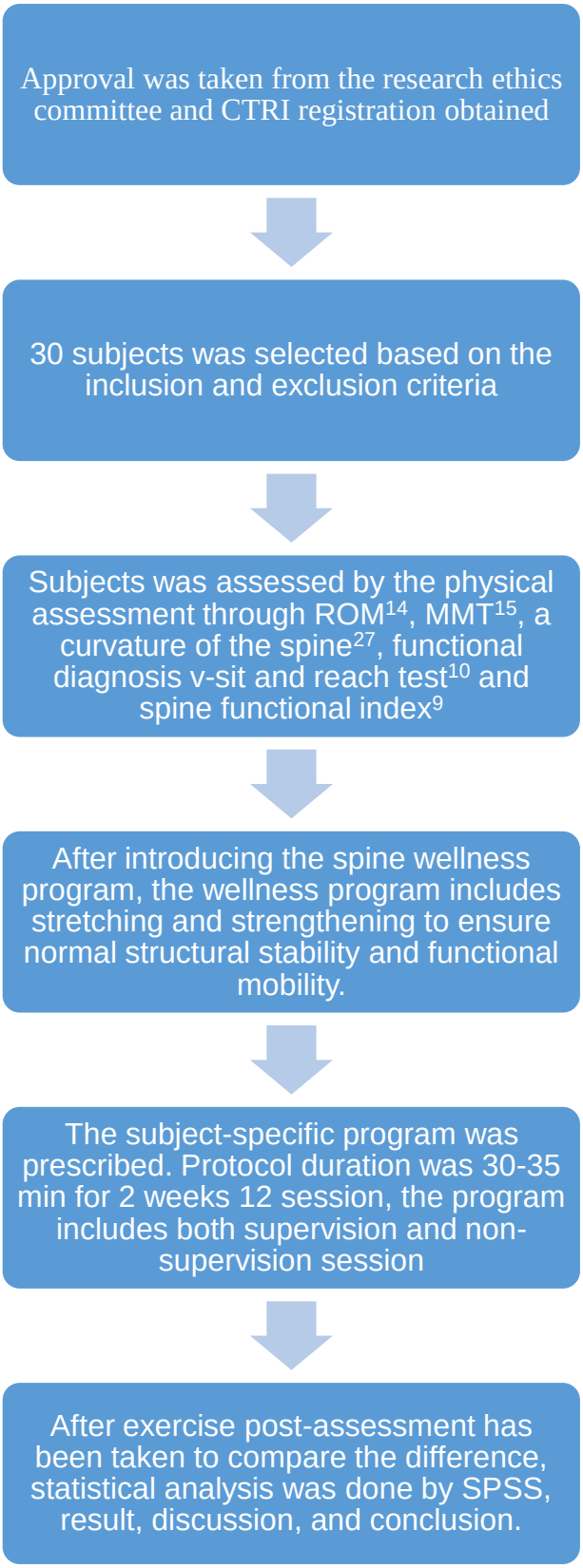
Type: Flexibility and mobility

Time : Each session 30-35 min.

Sessions : Total 12 sessions, 6 Supervised and 6 Non supervised

Repetition: For stretching 3 reps/day, strengthening 10 reps/day

Procedure:



Intervention program

CERVICAL

CERVICAL	MOTION	SHORTENING	LENGTHENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
ROM RESTRICTED	extension	Neck flexors	Neck extensors	Strengthening followed by stretching	Prone kneeling head bending forward and backward, isometric neck exercise	Scalene muscle stretch
ROM RESTRICTED	flexors	Neck extensors	Neck flexors	Strengthening followed by stretching	High lying position head unsupported flexion, isometric neck exercise	Trapezius stretch, scalene and SCM stretch
ROM RESTRICTED	Side flexion	Contralateral Scalene and SCM	Ipsilateral Scalene and SCM	Strengthening followed by stretching	High side-lying head unsupported side flexion, isometric neck exercise	Scalene muscle stretch, trapezius muscle stretch
ROM RESTRICTED	rotation	Contralateral SCM	Ipsilateral SCM	Strengthening followed by stretching	High side-lying head unsupported head rotation, isometric neck exercise	SCM stretch, scalene stretch
CERVICAL	MOTION	LENGTHENING	SHORTENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
DECREASE STRENGTH	extension	Neck extensors	Neck flexors	Strengthening followed by stretching	Prone kneeling head bending forward and backward, isometric neck exercise	Scalene muscle stretch
DECREASE STRENGTH	flexors	Neck flexors	Neck extensors	Strengthening followed by stretching	High lying position head unsupported flexion, isometric neck exercise	Trapezius stretch, scalene and SCM stretch

DECREASE STRENGTH	Side flexion	Ipsilateral Scalene and SCM	Contralateral Scalene and SCM	Strengthening followed by stretching	High side-lying head unsupported side flexion, isometric neck exercise	Scalene muscle stretch, trapezius muscle stretch
DECREASE STRENGTH	rotation	Ipsilateral SCM	Contralateral SCM	Strengthening followed by stretching	High side-lying head unsupported head rotation, isometric neck exercise	SCM stretch, scalene stretch

THORACOLUMBAR

	MOTION	**SHORTENING**	**LENGTHENING**	**INTERVENTION**	**STRENGTHENING EXERCISE**	**STRETCHING EXERCISE**
ROM restricted	Flexion	extensors	flexors	Strengthening followed by stretching	Curl ups, bilateral leg raise	Erector spine stretch, child pose stretching
ROM restricted	Extension	flexors	extensor	Strengthening followed by stretching	Superman, Burd dog	Cobra stretch
ROM restricted	Side bending	Contralateral side flexors	Unilateral side flexors	Strengthening followed by stretching	Side plank hip lift exercise	Quadratus lumborum stretch
ROM restricted	rotation	Contralateral rotators	Unilateral rotators	Strengthening followed by stretching	Russian twist, Supine bicycling crunches, trunk rotation exercise	Oblique muscle stretch

	MOTION	LENGTHENING	SHORTENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
DECREASE STRENGTH	Flexion	flexors	extensors	Strengthening followed by stretching	Curl ups, bilateral leg raise	Erector spine stretch, child pose stretching
DECREASE STRENGTH	Extension	extensor	flexors	Strengthening followed by stretching	Superman, Burd dog	Cobra stretch
DECREASE STRENGTH	Side bending	Unilateral side flexors	Contralateral side flexors	Strengthening followed by stretching	Side plank hip lift exercise	Quadratus lumborum stretch
DECREASE STRENGTH	rotation	Unilateral rotators	Contralateral rotators	Strengthening followed by stretching	Russian twist, Supine bicycling crunches, trunk rotation exercise	Oblique muscle stretch

	shortening	lengthening	intervention	Strengthening exercise	Stretching exercise
Excessive lumbar lordosis	lumbar extensors	Hip flexors, abdominal muscles	Strengthening followed by stretching	Curl ups, bilateral leg raise, Russian twist	Erector spine stretch, child pose stretching
Decreased lumbar lordosis	Hamstrings, Abdominal muscles	iliopsoas muscle, lumbar extensor	Strengthening followed by stretching	Superman, Burd dog, SLR	Hamstring stretch, cobra stretch

	SHORTENING	LENGTHENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
EXCESSIVE KYPHOSIS	pectoralis major, subclavius, and pectoralis minor	trapezius, rhomboids, and rotator cuff muscles	Strengthening followed by stretching	Blackburn exercise	Corner pec stretch

PELVIC

	SHORTENING	LENGTHENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
	iliopsoas, lumbar extensors	Abdominal muscles	strengthening, followed by stretching	Curl ups, bilateral leg raise, Russian twist	Erector spine stretch, child pose stretching
POSTERIOR PELVIC TILT	Hamstring, glutes, and lower abdominal muscles	Quadriceps, lower back muscles	strengthening, followed by stretching	Superman, squat, high sitting knee extension	Cobra pose, hamstring stretch
LATERAL PELVIC TILT	Opposite side abductors and erector spine	Same side erectors spine and abductors	Strengthening followed by stretching	Superman, Burd dog, side SLR	Erector spine stretch, child pose stretching, piriformis stretch

HIP

	MOTION	LENGTHENING	SHORTENING	INTERVENTION	STRENGTHENING EXERCISE	STRETCHING EXERCISE
ROM RESTRICTED	Flexion	Iliopsoas, rectus femoris	Hamstring, gluteus Maximus	Strengthening followed by stretching	Supine SLR, squatting	Hamstring stretch, unilateral knee to chest
ROM RESTRICTED	Extension	Hamstring, gluteus Maximus	Iliopsoas, rectus femoris	Strengthening followed by stretching	Squatting, standing hamstring curl	Iliopsoas and quadriceps stretch
ROM RESTRICTED	abduction	Piriformis, gluteus medias, gluteus-minimus	Adductors longus, brevis	Strengthening followed by stretching	Side SLR, squat to hip abduction	Butterfly stretch, sumo squat
ROM RESTRICTED	adduction	Adductors longus, brevis	Piriformis, gluteus medias, gluteus-minimus	Strengthening followed by stretching	Side lying hip adduction	Piriformis stretch, sumo squat

ROM RESTRICTED	Medial rotation	anterior fibres of gluteus medius and minimus, tensor fascia latae	biceps femoris, gluteus maximus, piriformis	Strengthening followed by stretching	Squat to hip abduction, side lying abduction	Unilateral knee to chest, piriformis stretch, hamstring stretch
ROM RESTRICTED	Lateral rotation	biceps femoris, gluteus maximus, piriformis	anterior fibres of gluteus medius and minimus, tensor fascia latae	Strengthening followed by stretching	Hamstring curl, Squat to hip abduction, side SLR	TFL stretch, sumo squat

	MOTION	**SHORTENING**	**LENGTHENING**	**INTERVENTION**	**STRENGTHENING EXERCISE**	**STRETCHING EXERCISE**
DECREASE STRENGTH	Flexion	Hamstring, gluteus Maximus	Iliopsoas, rectus femoris	Strengthening followed by stretching	Supine SLR, squatting	Hamstring stretch, unilateral knee to chest
DECREASE STRENGTH	Extension	Iliopsoas, rectus femoris	Hamstring, gluteus Maximus	Strengthening followed by stretching	Squatting, standing hamstring curl	Iliopsoas and quadriceps stretch
DECREASE STRENGTH	abduction	Adductors longus, brevis	Piriformis, gluteus medias, gluteus-minimus	Strengthening followed by stretching	Side SLR, squat to hip abduction	Butterfly stretch, sumo squat
DECREASE STRENGTH	adduction	Piriformis, gluteus medias, gluteus-minimus	Adductors longus, brevis	Strengthening followed by stretching	Side-lying hip adduction	Piriformis stretch, sumo squat
DECREASE STRENGTH	Medial rotation	biceps femoris, gluteus maximus, piriformis	anterior fibers of gluteus medius and minimus, tensor fascia lata	Strengthening followed by stretching	Squat to hip abduction, side-lying abduction	Unilateral knee to chest, piriformis stretch, hamstring stretch

DECREASE STRENGTH	Lateral rotation	anterior fibres of gluteus medius and minimus, tensor fascia latae	biceps femoris, gluteus maximus, piriformis	Strengthening followed by stretching	Hamstring curl, Squat to hip abduction, side SLR	TFL stretch, sumo squat

SCAPULA AND SHOULDER

	Present	**lengthening**	**shortening**	**intervention**	**Strengthening exercise**	**Stretching exercise**
protraction	Yes, or no	trapezius, rhomboids, and latissimus dorsi muscles	serratus anterior, pectoralis major, and pectoralis minor muscles	Strengthening followed by stretching	Black burn ex's	Corner pec stretch
retraction	Yes, or no	serratus anterior, pectoralis major, and pectoralis minor muscles	trapezius, rhomboids, and latissimus dorsi muscles	Strengthening followed by stretching	Wall pushups	Trapezius stretch, Last stretch
Elevation	Yes, or no	Upper trapezius, serratus anterior, levator scapulae	trapezius, rhomboid muscles	Strengthening followed by stretching	Shoulder shrug, Prone on elbow	Rhomboid stretch, treps stretch
depression	Yes, or no	Trapezius, rhomboid muscles	Upper trapezius, serratus anterior, levator scapulae	Strengthening followed by stretching	Black burn ex's	Trapezius stretch, lats stretch, levator scapulae stretch

Statistical analysis

Statistical analysis was done using SPSS version 25 was used to generate graphs and tables.

Variable was assessed for normality. For that value of skewness, kurtosis, histogram, and Shapiro-Wilk test was used.

For the normal distribution, the value of skewness and kurtosis should be between -1.96 to +1.96 and the value for the Shapiro-Wilk test should be greater than 0.05.

Data were normally distributed so the paired T-test (parametric) was used.

The level of significance was considered less than 0.05, the confidence interval was kept at 95%

Result:

Table 1: Range of Motion of Cervical Spine Test Analysis

		Mean	SD	T value	P-value
Left side rotation	Pre	14.57	1.524	4.894	0.000
	Post	13.17	0.699		
Right side rotation	pre	14.70	1.442	6.073	0.000
	Post	13.17	0.699		
Left side flexion	Pre	14.87	1.408	7.549	0.000
	Post	13.13	0.681		
Right side flexion	Pre	14.83	1.416	7.369	0.000
	Post	13.13	0.681		

Interpretation: Paired T-Test of Range of Motion was done. As per the data analysed, the p-value (probability value) of all ROM is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between Pre ROM score and Post ROM score. Moreover, there is also improvement seen in the mean Post ROM value

Table 2: Analysis of The Range of Motion Thoracolumbar Spine

		Mean	SD	T value	P value
Flexion	Pre	8.13	1.456	-6.326	0.000
	Post	9.70	0.535		
Extension	pre	8.17	1.440	-5.049	0.000
	Post	9.50	0.861		
Lt lateral flexion	Pre	35.17	7.159	8.732	0.000
	Post	27.33	4.088		
Rt lateral flexion	Pre	35.53	7.286	8.733	0.000
	Post	27.53	4.208		

Interpretation: Paired T-Test of Range of Motion of thoracolumbar spine was done. As per the data analyzed, the p-value (probability value) of all ROM is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between Pre ROM score and Post ROM score. Moreover, there is also improvement seen in the mean Post ROM value.

Table 3: Analysis of The Range of Motion Lumbar Spine

		Mean	SD	T value	P-value
Flexion	pre	7.00	1.414	-7.047	0.000
	post	7.77	0.935		
extension	Pre	3.07	1.461	-7.449	0.000
	post	3.80	1.064		

Interpretation: Paired T-Test of Range of Motion of the lumbar spine was done. As per the data analysed, the p-value (probability value) of all ROM is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between Pre ROM score and Post ROM score. Moreover, there is also improvement seen in the mean Post ROM value.

Table 4: V Sit and Reach Test

		Mean	SD	T value	P-value
V sit and reach test	pre	21.43	2.254	-5.215	0.000
	post	22.37	2.008		

Interpretation: Paired T-Test of v sit and reach test was done. As per the data analysed, the p-value (probability value) of all v sit and reach tests is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between Pre v sit and reach test score and Post v sit and reach test score. Moreover, there is also improvement seen in the mean Post v sit and reach test value.

Table 5: Spine Functional Index

		Mean	SD	T value	P-value
Spine functional index	Pre	94.13	3.636	8.363	0.000
	Post	99.47	1.383		

Interpretation: Paired T-Test of spine functional index was done. As per the data analysed, the p-value (probability value) of all ROM is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between the Pre SPI score and the Post SPI score. Moreover, there is also improvement seen in the mean Post SPI value.

Table 6: Manual Muscle Testing of the Spine

		Mean	SD	t value	P value
Flexion	Pre	4.07	0.740	-7.047	0.000
	Post	4.90	0.305		
Extension	Pre	3.87	0.730	-7.449	0.000
	Post	4.77	0.504		
rotation	Pre	4.07	0.740	-7.047	0.000
	Post	4.90	0.305		
t/extension	Pre	3.87	0.730	-7.449	0.000
	Post	4.77	0.504		

Interpretation: Paired T-Test manual muscle test was done. As per the data analysed, the p-value (probability value) of all MMT is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between the Pre MMT

score and Post MMT score. Moreover, there is also improvement seen in the mean Post MMT value.

Table 7: Curvature of The Spine

		Mean	SD	T value	P value
T1-T2	Pre	21.67	7.112	5.693	0.012
	Post	20.67	5.979		
T11-T12	pre	21.83	6.884	2.971	0.006
	Post	20.67	5.683		
L1-L2	Pre	11.00	5.931	-2.971	0.006
	Post	12.17	5.032		
L4-L5	Pre	11.17	6.254	-2.971	0.006
	Post	12.33	5.371		

Interpretation: Paired T-Test of curvature of the spine was done. As per the data analysed, the p-value (probability value) of all curvatures of the spine is 0.000 which is less than 0.05 (standard value). This shows there is a significant difference between Pre curvature of the spine score and Post curvature of the spine score. Moreover, there is also improvement seen in the mean Post curvature of the spine value.

Discussion:

Above study demonstrated that stretching exercises targeting the neck muscles trapezius, scalene, sternocleidomastoid significantly improve neck range of motion and increase neck functions among healthy individuals. When you stretch a muscle, your body responds by increasing blood flow to that area. The blood vessels around the targeted muscle widen to allow more blood to flow through, and your heart starts pumping more blood. Our results were in line with previous studies showing the benefit of stretching exercise for the neck condition.

the current study was to evaluate the effectiveness of stretching on thoracolumbar range of motion (ROM), functional limitation in a healthy individual. Erector spine stretch, child pose stretching, cobra stretch, quadratus lumborum stretch, oblique muscle stretch one can demonstrate improvement on thoracolumbar ROM.

the current study was to evaluate the effectiveness of stretching on lumbar range of motion (ROM), functional limitation in a healthy individual. Erector spine stretch, child pose stretching, cobra stretch, quadratus lumborum stretch, oblique muscle stretch one can demonstrate improvement on lumbar ROM. When you stretch a muscle, your body responds by increasing blood flow to that area. The blood vessels around the targeted muscle widen to allow more blood to flow through, and your heart starts pumping more blood. Our results were in line with previous studies showing the benefit of stretching exercise for the back condition.

v sit and reach test is one of the linear flexibility tests which helps to measure the extensibility of the hamstrings and lower back. In the post mean we can find the improvement in the flexibility in the hamstring and lower back. Because we did the back flexibility and strengthening exercise which helps in the back flexibility and mobility.

we find out to increase spine functional index score after this program, because our program is target the whole spine, and our program includes stretching and strengthening exercises which help in the improvement in spinal stability and mobility.

above study demonstrated that strengthening exercise targeting the back and core muscles and exercise we done curl-ups, bilateral leg raise, superman, burd dog, side plank leg lift, Russian twist significantly improve back range of motion and increased back functions among healthy individuals. In the pre mean we find out lumbar flexion strength is more than lumbar extension, which causes muscle imbalance. And this is one of the reasons for back pain, so in this wellness program, we fix it.

in the measurement of the curvature of the spine we find the subject is affected by poor posture that's why they have kyphosis, increase lumbar

lordosis, and some have a flat back syndrome. When the person's lumbar lordosis is increase so they have tightness in the back and weakness the abdominal muscle, the body's posture affects by the kinetic chain, and time our comprehensive program helps in the improvement in the spinal stability and mobility, after the program, we have seen a significant change in the curvature of the spine.

Conclusion

In context to result and discussion spinal wellness program must be taken into consideration in the early age of life within the lifestyle modification to prevent spine-related disease and disorder such comprehensive spinal wellness program can be prescribed to the community for health and wellness.

However, further study is needed to evaluate the efficacy of the present spinal wellness program with available therapeutic plans for understanding changes between the groups.

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Editor's choice

Current concepts on assessment of spasticity

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Assessing spasticity is an ongoing area of research interest, as it is important for both the diagnosis and prognosis of diseases and disorders. Physical and functional measures have been identified to report the status and progress of individuals with spasticity. This involves identifying overactive muscles or muscle groups and determining the effect of spasticity on various aspects of patient function, including mobility and activities of daily living (ADLs). Spasticity is commonly observed after conditions such as stroke, multiple sclerosis, spinal cord injury, traumatic brain injury (TBI), and lesions of the central nervous system (CNS).

The diagnosis of spasticity is based on a combination of physical signs, such as exaggerated tendon reflexes and muscle hypertonia, defined as velocity-dependent resistance of a muscle to stretching. Evaluation of spasticity should be based on clinical assessment, with additional biomechanical or electrophysiological measurements obtained during active and functional movements as adjunctive techniques. There are numerous clinical scales/questionnaires used to evaluate spasticity, including the Ashworth scale, modified Ashworth scale, spasm severity scale, clonus score, tone assessment scale, disability assessment scale, Barthel index (BI), multiple sclerosis spasticity scale, functional independence measure (FIM), and Fugl-Meyer Assessment (FMA). The FMA is a scale that evaluates spasticity using parameters such as sense, touch, pain, joint position, sense of hand, wrists, and body structure.

In the last decade, several advanced ways of diagnosing spasticity have been established, such as electromyography and myotonometry, which allow for impartial assessment by quantifying tissue development response.

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Editor's choice

Physiotherapy: A Crossroad between Science and Art

Dibyendunarayan Bid

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Abstract:

Physiotherapy is widely accepted as a critical component of many medical treatments; there is an ongoing debate over whether physiotherapy is more of an art or a science. The intersection of art and science makes it a unique and valuable practice. The scientific approach provides a framework for understanding the body and its mechanisms, while the artistic approach allows physiotherapists to use intuition and creativity to adapt to the patient's specific needs.

Keywords: Physiotherapy, Science, Art

Introduction

Physiotherapy is an area of healthcare that involves assessing, diagnosing, treating, and preventing physical dysfunction and pain. While it is widely accepted as a critical component of many medical treatments, there is an ongoing debate over whether physiotherapy is more of an art or a science. Some argue that physiotherapy requires a high degree of creativity and intuition, while others maintain that it is primarily based on scientific principles and empirical evidence. Here, we will explore the arguments for both positions.

Physiotherapy as an art

Physiotherapy is a discipline that involves working with patients to restore or improve their physical function, movement, and overall quality of life. While many people view physiotherapy as a scientific and evidence-based practice, others argue that it is more of an art form that requires creativity, intuition, and personalization.

Art is a way for people to convey themselves through imagination, creativity, and emotion. It is often associated with subjective experiences, and the value of art lies in its ability to elicit a response or emotion from the viewer or participant. In physiotherapy, the importance of creativity, intuition, and personalization is evident in many aspects of the practice.

One of the key arguments for viewing physiotherapy as an art is the importance of intuition. Intuition is the ability to understand something instinctively without needing conscious reasoning. In physiotherapy, intuition can be critical in helping the therapist to assess and treat the patient based on a combination of factors, including their medical history, symptoms, and lifestyle. Using their intuition, physiotherapists can better understand their patient's needs and develop more effective treatment plans.

Another important aspect of physiotherapy that aligns with the definition of art is creativity. Physiotherapists often need to use creativity to develop new treatment plans or modify existing ones to suit individual patients better. This might involve adapting exercises to make them more interesting or challenging, incorporating music or other forms of sensory stimulation into treatment sessions, or using visual aids to help patients understand their condition and the treatment process.

Personalization is also a critical aspect of physiotherapy that aligns with the definition of art. Personalization involves tailoring the treatment approach to meet each patient's unique needs and preferences. This might include adjusting the treatment plan based on a patient's goals, preferences, or lifestyle factors. By personalizing the treatment approach, physiotherapists can help ensure that the patient is engaged and invested in the treatment process, leading to better outcomes.

Finally, many examples exist of how physiotherapy can be seen as an art form. For example, some forms of physiotherapy, such as movement therapy, involve a high degree of creativity and self-expression on the part of the patient. In these cases, the physiotherapist works with the patient to develop a treatment plan incorporating movement, music, and other sensory stimulation to help the

patient improve their physical function and overall well-being.

In short, physiotherapy is a discipline that can be viewed as both a science and an art form. While the evidence-based and empirical approach to treatment is critical in achieving positive outcomes, creativity, intuition, and personalization cannot be overstated. By acknowledging the artistic aspects of physiotherapy, we can better appreciate the complex and nuanced nature of this important healthcare practice.

Physiotherapy as a science

While some view physiotherapy as an art form, others argue it is primarily a science-based practice. Physiotherapy involves using knowledge and skills based on scientific principles to promote healing and improve physical function.

Science is a systematic study of the natural world based on empirical evidence and tested by repeatable experiments. It involves observing, measuring, and analyzing data to make inferences and predictions. In physiotherapy, the scientific approach is evident in many aspects of the practice.

Using evidence-based practices and research is one of the key arguments for viewing physiotherapy as a science. The evidence-based practice integrates the best available research evidence with clinical expertise and patient values to make clinical decisions. Physiotherapists use evidence-based practices to guide treatment decisions and ensure patients receive the most effective care. Research is a critical part of physiotherapy as it helps to inform the development of new treatment techniques and approaches and to evaluate the effectiveness of current practices.

The importance of anatomy, physiology, and biomechanics in physiotherapy is another factor that supports the argument for physiotherapy as a science. These areas of study are fundamental to understanding how the human body works and how it can be affected by injury or illness. Physiotherapists use their knowledge of anatomy, physiology, and biomechanics to assess the patient's condition, develop treatment plans, and monitor progress. They use scientific principles to design exercises and other interventions that target specific areas of the body and promote healing.

In addition to using evidence-based practices, research, and scientific principles, physiotherapy involves using technology and specialized equipment. Physiotherapists may use ultrasound, electrical stimulation, or laser therapy machines to promote healing and relieve pain. They may also use specialized equipment such as braces, splints, or prosthetics to support the body or improve function.

While there is debate over whether physiotherapy is primarily an art or a science, many aspects of the practice align with the scientific approach. Evidence-based practices, research, anatomy, physiology, biomechanics, and technology all point to the scientific nature of physiotherapy. By recognizing the scientific aspects of the practice, we can better appreciate the vital role that physiotherapy plays in promoting healing and improving physical function.

Physiotherapy is both a science and an art

After examining the arguments for physiotherapy as an art and a science, it is clear that both perspectives have merit. Physiotherapy is a practice that involves both technical and scientific knowledge as well as creative and intuitive skills. The intersection of art and science in physiotherapy makes it a unique and valuable practice.

In physiotherapy, art and science work together to create an effective treatment plan tailored to each patient's unique needs. The scientific approach provides a framework for understanding the body and its mechanisms, while the artistic approach allows physiotherapists to use intuition and creativity to adapt to the patient's specific needs.

For example, while scientific principles may inform the choice of exercises or treatments, the physiotherapist's artistic approach allows them to modify these techniques to suit the patient's circumstances. This can involve adapting exercises to the patient's abilities or modifying treatments based on the patient's preferences or lifestyle.

The value of understanding both perspectives for physiotherapists and patients is significant. By recognizing physiotherapy's artistic and scientific nature, physiotherapists can use a holistic approach that considers the treatment's technical and personal aspects. This can lead to more effective treatments and better patient outcomes. Additionally, patients who understand physiotherapy's artistic and scientific nature may be more likely to engage in their treatment as they appreciate the personalized and evidence-based approach to their care.

While there is debate over whether physiotherapy is primarily an art or a science, it is clear that it is a practice that requires both technical and creative skills. The intersection of art and science in physiotherapy makes it a unique and valuable practice. By understanding and valuing both perspectives, physiotherapists and patients can work together to create effective and personalized treatment plans that promote healing and improve physical function.

Conclusion

Physiotherapy is both a science and an art, and physiotherapists should embrace both aspects in their practice. This is evidenced by the fact that evidence-based care improves the practice of physiotherapy and that understanding the fundamental logic behind practice can benefit professional development in several ways. Therefore, physiotherapists should combine the art and science of physiotherapy to provide the best care for their patients. Let's refer to it as the *artful application of science***.**

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AWARENESS TOWARDS PHYSIOTHERAPY AMONG GENERAL PUBLIC IN RURAL AREAS

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ABSTRACT

Introduction: The World Confederation of Physiotherapy policy statement states that "Physical therapy is services provided by physical therapists to individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan." It has been more than seven decades since inception of physiotherapy in India. Despite of its commendable results in prevention as well as treatment, awareness of physiotherapy still remains a big question in India.

Aim and Objective: To study the awareness about physiotherapy among general public in rural areas.

Material and Method: A survey was conducted using a questionnaire. A sample of 200 individuals drawn from the general public from villages around Delhi. They completed a structured questionnaire designed to test the knowledge of physiotherapy profession and services provided by physiotherapist. The obtained data was analyzed by using excel version 2301 and depicting the percentage of data.

Result: A total of 200 respondents comprising 104 (52%) men and 96(48%) women participated in the study. Majority of respondents never heard about physiotherapy and knew only of physiotherapy services in Bone, joint and nerve related dysfunction but were least aware of its results in other community services and medical conditions. The main source of information was newspaper and relatives.

Conclusion: The awareness is not satisfactory in rural area. The awareness about physiotherapy must be enhanced among rural population.

Key Words: Physiotherapy, Rural population, India, public awareness.

INRODUCTION

The policy statement of the World Confederation of Physiotherapy defines physical therapy as services provided by physical therapists to individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan. This service is provided in circumstances where movement and function are threatened by ageing, injury, pain, diseases, disorders, conditions and/or environmental factors, with the understanding that functional movement is central to what it means to be healthy. Physiotherapy has been providing commendable results in delivering community and health promoting rehabilitation in a variety of conditions, including medical disorders inside and outside of the ICU, primary and secondary prevention of non-communicable disorders, pain management, and sports-related services. However, awareness of physiotherapy remains a big question in India despite its more than seven decades of inception. Physiotherapists are involved in promoting, preventing, and treating disease to ensure optimal functioning and better quality of life for the overall population of the world. In the 1920s, Sister Kinney used exercise, massage, and traction to treat polio patients, which marked the turning point for the physiotherapy profession. The advent of physiotherapy in India was in 1952, due to an outbreak of Poliomyelitis in Mumbai. In 1953, the first Physiotherapy School and Centre was established in Seth G. S Medical college and K.E.M hospital by the Government of India and Mumbai municipal corporation (MMC) with the support of the World Health Organization (WHO). Despite having varied roles, the extent of awareness about physiotherapy in rural areas remains doubtful, not only in India but also all over the world. One probable reason may be a lack of knowledge about physiotherapy among them.[1-3]

Methodology:

A survey was conducted in the villages around Delhi in 2021 and 2022 to assess the level of awareness of physiotherapy. 200 subjects aged 20-50 years who could communicate in Hindi and were willing to participate were included in the study. A self-administered questionnaire was used to collect the data, and participants were informed that their information would be kept confidential. The questionnaire was divided into three parts: personal information, knowledge about physiotherapy, and sources of information. The researcher went person to person and asked them to fill the questionnaire. The questionnaire was prepared in Hindi to overcome the language barrier. The obtained data was analyzed using Excel and presented in tables and pie charts.

RESULT:

The obtained data was analyzed by using excel version 2301 and depicting the percentage of data. After analyzing the data was presented in tables and pie charts. The result of data showed the level of awareness in percentage form for the year 2021 and 2022. Out of 200 participants 104 (52%) were men and 96 (48%) women. The highest number of participants were in the range of (20- 30) years (45%) and very few participants (29%) were in the age group of 40-50 years.

The obtained data shows that very few participants (44%) have heard and have knowledge about physiotherapy more than a half population (56%) had never heard about physiotherapy. And (60%) population didn’t

know about physiotherapist and their work. Only very few participants (37%) had an idea about when to visit a physiotherapist and knowledge about that exercise therapy and modalities are given during physiotherapy treatment. The data indicated that there is a low level of awareness towards physiotherapy in people residing around rural area.

Awareness about specialties in Physiotherapy:

There was a varied response showing more awareness about orthopedic and neurological conditions in the rural community. Majority of respondents gave the response that physiotherapy mainly dealt with orthopedic conditions 88 (44%) and neurology conditions 60 (30%) while 46 (23%) expressed that sport injuries are treated by physiotherapy. Only 34 (17%) respondents believed that physiotherapy also deals with cardio –pulmonary conditions. Less than 15% knew physiotherapy helps in managing obesity and diabetic conditions and very few only 10% were aware that physiotherapy also deal with gynecology problems

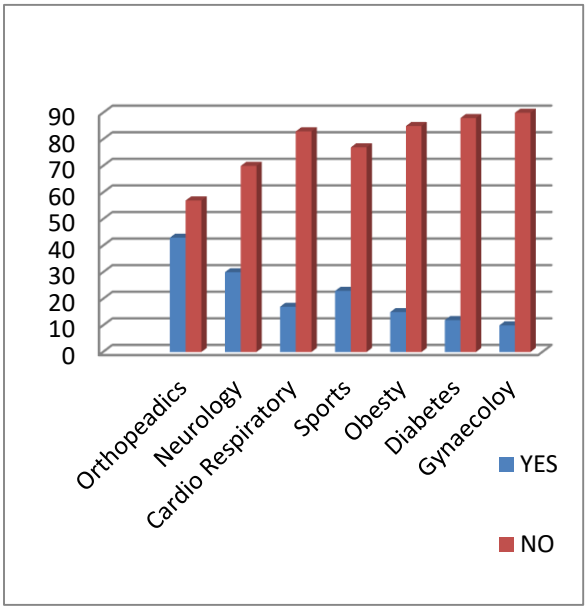


TABLE 1.1 SHOWING RESULTS OF PART B QUESTIONNAIRE

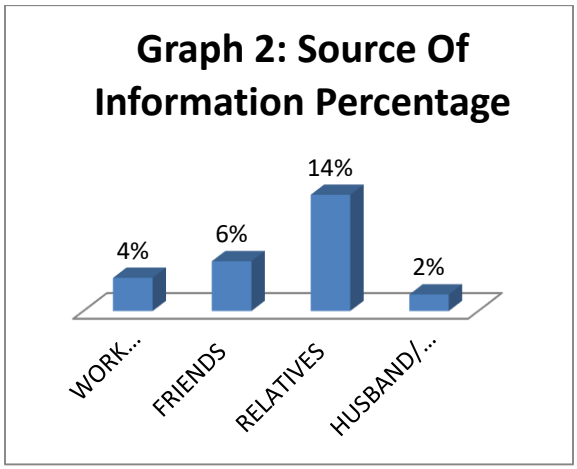
	AWARENESS OF PHYSIOTHERAPY		
S.NO	**QUESTIONS**	**YES %**	**NO %**
1	Have you ever heard about physiotherapy?	44%	56%
2	Do you know what is physiotherapy?	44%	56%
3	Have you ever taken physiotherapy?	30%	70%
4	Do you know who is a physiotherapist and what he does it do?	40%	60%
5	Do you know when to visit a physiotherapist?	37%	63%
6	Do you know electrical modalities are given during physiotherapy?	39%	61%
7	Do you know exercise therapy is given during physiotherapy?	35%	65%

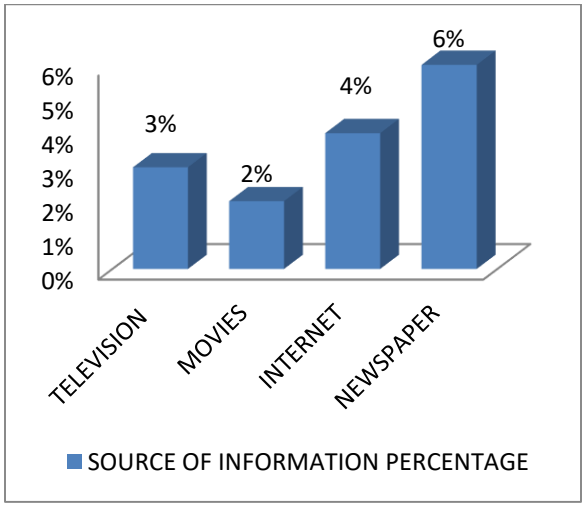
TABLE 1.2 SHOWING RESULTS OF AWARENESS ABOUT SPECIALTIES OF PHYSIOTHERAPY

CONDITIONS	(% of subjects answer)YES	(% of subjects answer) NO
ORTHOPEADICS	44	56
SPORTS	23	77
NEUROLOGY	30	70
CARDIO-PULMONARY	17	83
GYNECOLOGY	10	90
DIABETES	12	88
OBESITY	15	85

SOURCE OF INFORMATION IN RURAL AREAS ABOUT PHYSICAL THERAPY:

The source of information in rural areas around Delhi about physiotherapeutic services is as depicted in the Graph 2 and 3.





Graph 3: Source of information in mass media

Discussion:

The objective of this study was to assess the level of awareness about physiotherapy among individuals residing in rural areas. Due to the vast geographical and cultural diversity in India, there are significant differences in the knowledge levels of people in urban and rural areas. This has also been observed in other countries where a considerable percentage of participants were not familiar with physiotherapy in rural areas.

The findings of this study indicate that the awareness of physiotherapy among the rural population is low, with only 44% of individuals being aware of it. Out of the 200 participants, 70% had never received any physiotherapy treatment before, which may be attributed to the lack of exposure to physiotherapy management and services. The graphs in the study demonstrate a low level of awareness about physiotherapy among individuals residing in rural areas around Delhi.

A study by Paul et al. reviewed the awareness of physiotherapy across the globe within countries having High Development Index (HDI) and Low Development Index (LDI). The study found a lack of awareness about physiotherapy even in countries with High Development Index (HDI). However, significant changes have been observed in the urban areas of India since 2015, as reported by various authors from different locations.

The majority of individuals in rural areas believed that physiotherapy mainly dealt with orthopedic conditions (44%) and neurological dysfunctions (30%). The study suggests that the rural population around Delhi is least aware of the various services that physiotherapy can offer in the field of cardiorespiratory, obstetrics and gynecology, metabolic disorders, and many others. Only a

select number of participants knew that physical therapy services can deal with other systems of the human body.

The findings of this study indicate the need for educational programs to improve public awareness and knowledge levels, particularly among less-educated individuals in rural areas. The low level of education and unavailability of physiotherapy services in rural areas may be the main reasons behind the lack of knowledge. Physiotherapists and the government should take measures to increase awareness and provide physiotherapy services among the rural population and Mohalla clinics in villages around Delhi. Regular physiotherapy health camps and treatment camps should be conducted at regular intervals in rural areas to improve awareness about physiotherapy among people.

Conclusion:

The study reveals that most individuals in rural areas around Delhi are unaware of physiotherapy and have minimal knowledge about the specialized services offered by physiotherapy professionals. Therefore, public awareness about physiotherapy and the conditions that a physiotherapist can deal with needs to be improved.

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Comprehensive Rehabilitation Approach for Managemenof Paraplegia Due to Pott's Spine- A Case Report

Neha ,Tushar Palekar

Abstract

Pott's Spine is a degenerative condition of spine leading to destruction of intervertebral disc and vertebral body. Management of pott's spine is multidisciplinary including orthopaedic surgeon, general physician, physiotherapist and many more. Paraplegia is a common complication of pott's spine which requires special attention.

In this case the patient presented with loss of sensation and movement in lower limb. Physiothersapy rehabilitation program was planned based on the clinical presentation of the patient. Sensory integration, Roods protocol, Electrical stimulation were the key aspects of management. 8 weeks of rehabilitation protocol was given and effect of physiotherapy was seen in the case. Post 8 weeks significant improvement was seen in muscle tone and range of motion was imitated by the patient. Thus, physiotherapy has a significant role in improving the muscle tone and quality of life of the patient suffering from paraplegia.

Keywords: - Rehabilitation, Case Report, Pott's spine, tuberculosis.

Introduction

Tuberculosis is an infectious condition caused by the manifestation of Mycobacterium Tuberculosis which is transferred through air[1]. Tb is one of the top 10 causes of mortality globally with incidence of 210 cases per 1 lakh population in India, India is on 36th position in term of incidence.[2]Only 10 percent individuals infected by mycobacterium get active TB, others become career.[3] Tb being a communicable disease always draws special attention in terms of management and restricting the disease.

Potts Spine is the spinal infection of tuberculosis. 1 percent of Tb cases leads to spinal tuberculosis due to manifestation of the infection in spine[3]. The spread occurs through the blood vessels. Thoracic region is the most common area of infection, leading to the collapse of intervertebral disc and the vertebral body. Paraplegia is a complication of Potts spine, which can be divided as active onset or late onset paraplegia.[4] Management of paraplegia involve use of steroids, splinting and physical therapy

Physiotherapy in case of paraplegia focus on improving the quality of life of the patient. Various treatment approaches are used in management based on the clinical presentation of the patient.[5] Physiotherapy helps in preventing the muscle atrophy and further deteriorating the patient's condition. Electric stimulation is a method used to stimulate the nerve and muscles in order to maintain their functions. Depending on the type faradic or galvanic current is determined and delivered to the patient. In this case report we discuss the role of physiotherapy in management of paraplegia post laminectomy in a patient with potts spine.

Case Presentation

A 66 year old male retired gardener with right hand dominance was referred to physiotherapy department post laminectomy and debridement with the complaints of pain in back region ,inability to control urine and stools and inability to move his lower limbs. Patient gives a history of pain in upper back region 5 months ago .One month later the patient visited hospital and investigations like X-Ray, MRI were performed .He was diagnosed with Potts Spine. He was put on DOTS regime and got operated for the same (debridement and laminectomy done at the level of D4-D5 D5-D6 D6-D7)

Figure 1- X-Ray of Thoracic Spine

Figure 2- MRI of Thoracic Spine

On posture assessment kyphosis and barrel chest was seen
On assessment hypoesthesia and hypoalgesia below the T12 level of dermatomes

Motor Examination-

Hypotonia was present in B/L lower limbs

Range of motion: - No active range is present in bilateral lower limb

Babinski- Absent

Deep:	Rt	Lt
Biceps	++	++
Triceps	++	++
Knee	0	0
Ankle	0	0

Physiotherapy Management

Phase 1(1-8 weeks)

Goals

Patient Education, avoid Secondary Complications, normalize the tone, decrease the work of Breathing, Sensory Integration, Proximal muscle strengthening, Bowel and Bladder Retraining

Patient Education- Educate the patient about this condition, precautions to be taken, importance of respiratory hygiene and the role of physiotherapy in his condition and the importance of physiotherapy. To avoid pressure sores: - Two hourly positioning, airbed was given, Deep Vein Thrombosis (DVT) pumps were given and passive ankle toe movement every 2 hours was advised to the care taker. Positioning was given to avoid contractures and hip knee ankle foot orthosis was given to prevent foot drop. Roods protocol was used to normalise the tone methods like quick icing, fast brushing, quick stretching were given. Fast icing for 8 minutes from proximal to distal direction was given once a day. Quick stretching was given for dorsiflexors, hamstring and adductor was given. Heavy joint compression was given for ankle, knee and hip joint. Faradic stimulation was given for peroneal nerve 3 sets of 30 repetition. To reduce the work of breathing segmental breathing technique was taught. Pursed lip breathing is given to increase expiration. Different textures are used we progress from soft to rough gentle strokes 3-4 are given per dermatome to improve sensory feedback. Proximal muscle strengthening with 1kg weight was given.

Phase 2

Goals- Maintain the goals achieved in phase 1, improve the tone of muscles, maintain the muscle integrity. Teach the activities of daily living. Standing and ambulation

To improve the tone of muscles, roods protocol of fast icing, quick stretching and heavy joint compression was continued. To maintain the muscle integrity, galvanic stimulation was given to quadriceps muscles 3 contractions 3 sets. Wheelchair ambulation was given to maintain psychosocial wellbeing. Hip knee ankle orthosis was prescribed. Assisted sit to stand was given 10 repetition 3 times a day. Passive range of motion exercises were given to the patient in order to maintain the available range of motion and give the patient kinaesthetic feedback. Range of motion exercises were performed 4 times a day for 10 repetition.

Timeline	Goal	Intervention	Dosage
0-2 weeks	• Patient education • Secondary Complication • Decrease the work of breathing	• Explain the patient Dos and Don't • Airbed, two hourly positioning • Segmental Breathing	• 7 repetition 3 times a day
3-4 weeks	• Sensory integration • Normalize the muscle tone	• Different Textures in every dermatome • Roods approach- fast icing, heavy joint compression • Passive Range of Motion	• 3 repetition in each dermatome from soft to hard • 8 minutes icing • Joint compression 1 repetiton • 10 repetation 4 times a day
5-8 weeks	• Maintain the muscle integrity • Standing	• Galvanic stimulation for quadriceps • Sit to stand exercises were given	• 3 sets with 30 contractions in each set • 10 repetation, 3 sets

Discussion

In this case report we present a case of 66 year old male with paraplegia due to tuberculosis of spine. The patient presented with hypoestesia and hypotonia. The patient was operated for the TB spine with debridement and laminectomy. Post-surgery the physiotherapy intervention was given. The primary goal of physiotherapy was to make the patient independent for which normalizing the tone and maintaining the muscle strength was of great importance, rehabilitation protocol was planned considering this. 8 weeks of in hospital protocol was given and patient was further referred for physiotherapy in out patients physiotherapy department.

In 2016 a study was conducted to check the effect of human embryonic stem cell transplant and physiotherapy in subjects with spinal cord injury. They concluded that human embryonic stem cell along with physiotherapy has better results in terms of pain and improving gross motor and fine motor functions.[6]Another study was conducted in 2022 in which spinal cord injury post road traffic accident was seen. Physiotherapy rehabilitation protocol was given to the patient and significant improvement was seen in muscle strength ans ASIA score.[7]

Conclusion

Pott's Spine is a destructive version of tuberculosis spine, both the vertebrae and intervertebral discs are affected in such cases. Management of Pott's spine is a multidisciplinary approach. Physiotherapy plays and important role in maintaining the available functions and improving the quality of life of the patient.

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