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PHYSIOTRENDS

Advancing Physiotherapy Knowledge & Innovation

ABDOMINAL
EXERCISE
EFFECT

SPORTS
NUTRITION

DRY NEEDLING
IN NECK
PAIN

SMART
REHABILITATION
IN GERIATRIC CARE

CLINICAL
REASONING

October 2024



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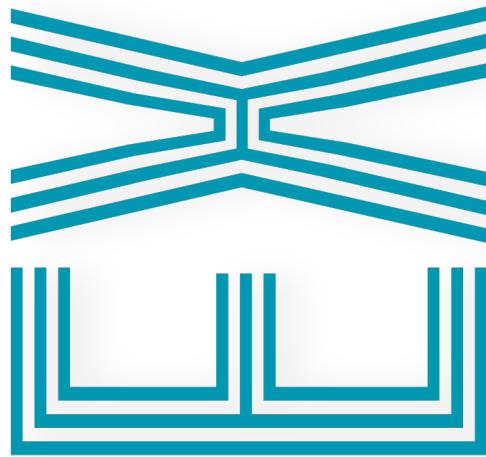
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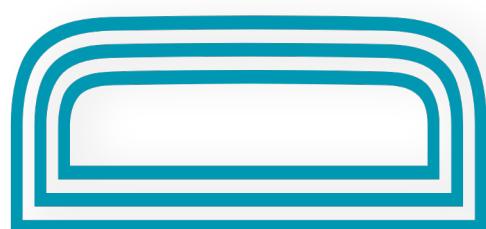
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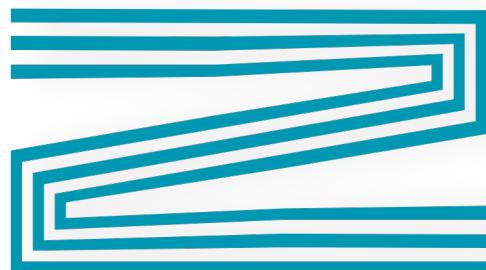
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1



2



Smart Rehabilitation: Leveraging Technology for Enhanced Geriatric care



Dr. Disha Monsara

SPORTS NUTRITIONS

Dr. Bhoomi Rathod,
Dr. Camy Bhagat,
Dr. Paras Bhura

3

Effects of different abdominal exercises on abdominal strength and endurance

Dr. Ayesha Patel,
Dr. Maitri Patel

4

Analgesic Effects of Dry Needling and Active Release on Upper Trapezius Muscles in Neck Pain Patients

Dr. Anita Singh

5

How effective Clinical reasoning empowers patients and improves physiotherapy outcomes

Dr. Mohammed Amjad Khan



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Dear Readers,

Welcome to Volume 1, Issue 4 of Physiotrends Digital Magazine. This month, we delve into some fascinating topics that are shaping the future of physiotherapy and rehabilitation.

In this issue, we highlight Smart Rehabilitation in Geriatric Care, exploring how technology and innovation are revolutionizing the way we approach the aging population. We also examine the Effect of Abdominal Exercises, an insightful piece on the benefits and limitations of core-strengthening exercises, especially in relation to posture and overall health.

For our sports enthusiasts, we have an article on Sports Nutrition, guiding you through the essentials of fueling your body for optimal performance. Our piece on Dry Needling for Neck Pain explores this increasingly popular technique and its efficacy in treating chronic discomfort.

Lastly, our feature on Clinical Reasoning delves into how physiotherapists can refine their decision-making processes for better patient outcomes.

We hope these articles inspire and equip you with valuable knowledge. Your feedback, as always, is greatly appreciated.

Warm regards

Message
from
Chief Editor



Dr. DARSHAN PARMAR

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Dear Readers,

As we step into the final quarter of 2024, it is a moment of reflection and gratitude for all the milestones we've reached together. In this fourth issue of PhysioTrends, I am filled with immense pride in how far our digital magazine has come, thanks to the trust and support of our growing community of readers, contributors, and industry experts.

October brings with it a fresh perspective on health and well-being, and this issue is packed with insightful articles, research updates aimed at helping you stay ahead in the ever-evolving field of physiotherapy. Whether you're a student, practitioner, or health enthusiast, our goal remains to provide valuable knowledge that empowers you to make informed decisions for better health outcomes.

As we continue to grow, I encourage you to share your feedback and ideas, as your voice plays a crucial role in shaping PhysioTrends into a platform that serves you best. We are committed to bringing you more engaging content and creating a global community where ideas, innovations, and best practices in physiotherapy are celebrated.

Here's to a future of growth, learning, and well-being for all!

Message
from
founder



Dr. SUJAY MAKWANA

Consultant Neuro-
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Message for Readers

Discover the Latest in Physiotherapy with PhysioTrends

Welcome to the October 2024 edition of PhysioTrends! This month, we're delving into cutting-edge topics in physiotherapy to help you stay informed and inspired.

Key Highlights:

Sports Nutrition: Learn how proper nutrition can optimize athletic performance and recovery.

Abdominal Exercise Effect: Explore the benefits and techniques of targeted abdominal exercises for core strength and stability.

Dry Needling in Neck Pain: Understand the role of dry needling in managing neck pain and improving mobility.

Clinical Reasoning: Gain insights into the decision-making process behind effective physiotherapy interventions.

Plus, explore more on our digital platform: PhysioTrends.vercel.app for exclusive content and updates.

Join us on this journey of advancing physiotherapy knowledge and innovation. Together, let's create a healthier and more active world!

Message from Co-Founder

SMART REHABILITATION: LEVERAGING TECHNOLOGY FOR ENHANCED GERIATRIC CARE

**DR. DISHA
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Geriatric rehabilitation involves a collaborative procedure between a medical professional and patients with the goal of preserving or regaining optimal function in multiple domains of life. New methods for assisting geriatric rehabilitation are provided by Internet of Things (IoT)-based technologies.

Such technologies may facilitate easy and real-time data communication between healthcare providers to support the delivery of care, in addition to providing tools for measuring and monitoring health issues. The elderly population may benefit significantly from Internet of Things (IoT) technologies that guarantee efficient and equitable rehabilitation. Examples of IoT are Bio stamp and Ambient sensor devices.

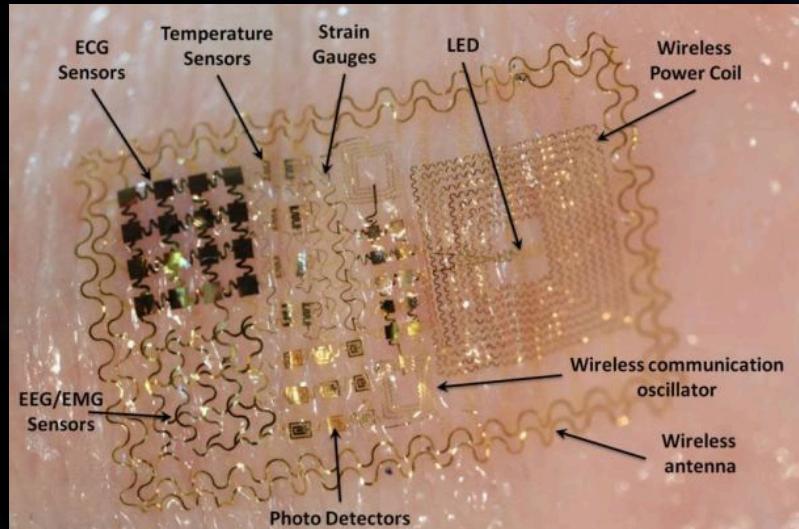
BIO STAMP:

Bio stamp is a thinner than a Band-Aid. The sensors monitor temperature, movements, heart rate, and all these vital signs which are transmitted wirelessly to an application.

The micro-controller efficiently processes signals from the 3-axis accelerometer and gyroscope, sampling the sensor data for storage in flash memory or wireless transmission via Bluetooth.

Users can establish wireless Bio Stamp device's operating parameters such as sampling rate, measurement type and measurement range prior to data collection by using a customized mobile application. Additionally, this intelligent mobile device makes it easier for data from the Bio stamp sensors to be transferred to a cloud server for further evaluation.

The Bio Stamp might upload its data to a nearby smartphone for analysis through near field communication (NFC), a wireless technology that allows devices to communicate data. Ideally, the patch can be linked with a thin-film battery from a commercial provider, or a phone with an NFC chip can be waved over the patch to enable continuous data transmission between the patient and the clinician.



Uses of this device :

- 1) **Health Monitoring:** By continuously tracking vital signs like body temperature, heart rate, and hydration levels, these gadgets can aid in the early detection of health problems.
- 2) **Fall detection:** By integrating accelerometers and gyroscopes, bio stamps can identify falls a typical risk for the elderly and send immediate signals for prompt assistance.
- 3) **Medication Management:** They can help patients in line to treatment plans by keeping track of drug levels in the body and reminding them when to take their medication as prescribed.
- 4) **Chronic Disease Management:** Bio stamps can give medical professionals access to real-time data on ailments like COPD, diabetes, or hypertension, facilitating better management of chronic illnesses.
- 5) **Comfort and Convenience:** Bio stamps are lightweight, non-invasive, and do not limit movement, which makes them more comfortable for senior users than typical monitoring systems, which can be heavy or painful.
- 6) **Remote Healthcare:** Bio stamps can provide data to medical practitioners via the internet negating the need for recurrent hospital visits as telemedicine becomes more common.

This advanced technology guarantees ongoing monitoring of health in a convenient and discrete manner which may significantly enhance their quality of life for elderly patients.

AMBIENT (IN-HOME) SENSORS:

In the past, a concept known as "ambient intelligence" has served as the basis for the research and development of a variety of assistive technologies. This paradigm aims to empower individuals by creating digital environments that are perceptive, flexible, and human-centered. Ambient aided technologies are those that utilize ambient intelligence to support assisted living.

Ambient or in-home sensors may provide important information on the context and interactions of a person with their surroundings. A variety of environmental characteristics, including motion, light, temperature, pressure, and humidity, can be monitored with the use of ambient sensors. A range of sensors found in homes, including pressure sensors, webcams, and accelerometer can be used to identify anomalies such as falls and abrupt changes in activity. Additional uses for ambient house sensors include social isolation, stress, and loneliness monitoring.

In the last few years, ambient assisted living (AAL) technologies have become more and more popular, offering creative solutions to the problems associated with an aging population. In addition to supporting people in maintaining and pursuing their current activities, AAL technology has the potential to improve the quality and cost-effectiveness of health and social services, as well as enable people to continue participating in activities at home and in the community as they age. Despite the lack of a consensus definition for AAL, the phrase "ambient assisted living" is frequently used in gerontechnological research and development. There are three generations in the development cycle of ambient assisted living.

<u>1st Generation AAL</u>	<ul style="list-style-type: none"> • Connectable devices • Reacts to an emergency • Needs user to sound alarms, etc.
<u>2nd Generation AAL</u>	<ul style="list-style-type: none"> • Sensors for the home • May feel intrusive • Automated detection and response to emergencies
<u>3rd Generation AAL</u>	<ul style="list-style-type: none"> • Wearable devices and home sensor integration • Assistance and tracking for prevention • Less obstructive

To enable people to live longer stay socially connected and age independently. AAL generally refers to the integration of information and communication technologies (ICT), stand-alone assistive devices, and smart home technologies into a person's everyday living and working environment. Through the integration of actuators, smart interfaces, artificial intelligence, and sensors, AAL creates supporting home environments. Traditional assistive technologies for individuals with disabilities, universal design approaches to accessibility, usability, and acceptability of interactive technologies, and the new ambient intelligence (AI) computing paradigm which offers pervasive, intelligent, and discrete assistance—are the foundations of AAL.

However, AAL technology has the potential to be adaptive to the varied nature of old age. It can anticipate and respond to the changing demands of older persons. Research on the possibilities of such technologies for healthy, frail, or dementia-stricken older persons has been limited to this point in AAL history. Research from the past has mostly overlooked how AAL technology might improve the daily lives of people with mild cognitive impairment (MCI). As long as daily activities are not hindered, mild cognitive impairment (MCI) is described as a noticeable loss in cognitive ability (e.g., memory, decision making, problem solving, and understanding). Up to 15% of adults over the age of 65 experience it, making it a problem for an important portion of the elderly population.

For individuals with motor cognitive impairment (MCI), successful assistance for independent living and aging in place is especially important because, in the event that it fails, it may keep them from experiencing severe pain and/or the high expenses of specialized care. With no viable pharmaceutical option at this time, AAL is the most appealing choice for offering this kind of support. But attempts to propose treatments are complicated because MCI refers to a variety of illnesses that show differently and are poorly understood.

AAL technologies that are designed to help older persons with cognitive impairments (mostly MCI) with the difficulties they face in their daily lives, as well as AAL technologies that could be more broadly beneficial to that target people.

Leveraging advancements in IoT (Internet of Things), AI, and machine learning, ambient sensor technology are growing more complex and adaptable. Numerous environmental parameters, including temperature, humidity, air quality, light levels, and even sound, can be monitored by these devices.

Usage of ambient sensors:
1)Integration with Digital Homes: Ambient sensors are frequently included into the ecosystems of smart homes, enabling automated temperature, lighting, and cooling adjustments based on real-time data.

2)Health Evaluation: To improve health outcomes, certain sensors are made to monitor indoor air quality and can send out alerts about allergens, pollutants, or CO₂ levels.

3)The Efficiency of Energy:
By evaluating environmental factors and recommending or automating processes based on their findings, these appliances aid in an optimization of energy consumption.

4)Edge information technology: This technique, which is widely used in smart cities and industrial applications, reduces latency and use of bandwidth by processing information locally on a large scale.

5)User Privacy: Due to the growing emphasis on data privacy, many ambient sensors are made to collect as little personal data as possible while yet offering valuable information.

6)Wearable Technology: As ambient sensors are incorporated into wearable, individuals can now personally monitor the conditions around them and how they affect their health

SPORTS NUTRITIONS



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WHAT IS SPORTS NUTRITION ?

It can be defined as the application of nutrition knowledge to a practical daily eating plan focused on providing the fuel for physical activity, facilitating the repair and rebuilding process following hard physical work, and optimizing athletic performance in competitive events, while also promoting overall health and wellness.

The Nutrient Trio: Carbs, Proteins, Fats – A Dietary Dance

Carbohydrates, proteins, fats, vitamins, minerals, and water are recognized as essential nutrients. Within the body, carbohydrates are metabolized into glucose, serving as the primary energy source for all forms of physical exertion. These nutrients are abundant in a diverse range of foods, encompassing grains, fruits, vegetables, as well as various milk substitutes such as soy, rice, and nut-based beverages.

Proteins, composed of amino acids, play a crucial role in the development, growth, and repair of muscles and other bodily tissues, making them vital for recovery following intense physical exercise. While proteins are present in many foods including grains and vegetables, they are predominantly found in dairy and dairy alternatives, along with meat and plant-based protein sources such as soy products, nuts, seeds, and legumes.



Pre-workout meals should be high in carbohydrates and moderate in protein to provide energy and support muscle function. Post-workout meals should include protein to aid in muscle recovery and repair. Fats, also referred to as lipids, are derived from both plant and animal sources in our diet. Triglycerides represent the most prevalent form of fat. Other types include cholesterol and phospholipids. Fats play a vital role in providing structural integrity to cell membranes, supporting hormone production, forming the insulating sheath around nerve cells, and aiding in the absorption of fat-soluble vitamins.

Fat primarily serves as an energy source during periods of rest and during low- to moderate-intensity physical activities. Chronic inflammation can lead to tissue damage and elevate the risk of injuries. Consuming certain foods, particularly those high in omega-3 fatty acids (such as fatty fish, flaxseeds, and walnuts) and antioxidants (such as fruits, vegetables, and nuts), can help mitigate inflammation due to their anti-inflammatory properties. Vitamins play a crucial role in a multitude of bodily functions and processes essential for maintaining health and preventing disease. They are categorized based on their solubility: water-soluble (including B vitamins and vitamin C) and fat-soluble (comprising vitamins A, D, E, and K), which influences their absorption, transportation, and storage within the body.

Carbohydrates, fats, and proteins, are also known as energy nutrients, provide the body with energy. This energy is stored in the chemical bonds of these nutrients and released during metabolic processes that break them down into carbon dioxide and water. Some of this released energy is captured to form adenosine triphosphate (ATP), the body's immediate energy source for cellular functions. The remaining energy is dissipated as heat. ATP is essential for muscle contraction and, without it, athletes could not perform physical activities.

The Nutrient Superstars: Exploring the Vital Roles of Vitamins, Minerals, and Water

Vitamins are ubiquitous in the diet, present in nearly all food groups, such as fruits, vegetables, grains, meat and plant-based protein sources, dairy and its alternatives, and certain fats. Collagen, a protein that provides the structural foundation for tendons, ligaments, and other connective tissues, relies on nutrients that support its synthesis. Foods high in collagen-boosting nutrients, like vitamin C found in citrus fruits, bell peppers, and strawberries, are beneficial for maintaining the health and integrity of these tissues, thereby reducing the risk of injuries such as tendonitis and ligament strains.

Minerals are essential for tissue development and the regulation of bodily processes. Physical activity stresses muscles and bones, increases the demand for oxygen transport in the blood, and results in sweat and electrolyte loss, necessitating sufficient mineral intake and replenishment. Minerals are divided into major minerals such as calcium, sodium, potassium, chloride, phosphorus, magnesium, and sulfur and trace minerals, including iron, zinc, copper, selenium, iodine, fluoride, molybdenum, and manganese. These minerals are predominantly found in meat, beans, and dairy products.

The body consists of 55–60% water, integral to nearly all tissues and fluids. In sports, water is crucial for regulating temperature, lubricating joints, and transporting nutrients to active tissues. Besides plain water, hydration can be maintained through beverages like juices, milk, coffee, tea, and water-rich foods such as fruits, vegetables, and soups. Dehydration can impair performance and increase the risk of injuries like muscle cramps and heat-related illnesses. Athletes should ensure adequate fluid and electrolyte intake before, during, and after exercise. Additionally, sufficient calcium and vitamin D are vital for bone health, reducing the risk of fractures and stress injuries. Athletes should consume calcium-rich foods, such as dairy products, leafy greens and obtain adequate vitamin D from sunlight and supplements if necessary.

Nutritional Navigation: Navigating Dietary Guidelines for Optimal Health

The Indian Council of Medical Research (ICMR), guided by Dr. Hemalatha R, Director of ICMR-NIN, has updated its Dietary Guidelines for Indians (DGIs). The revised guidelines, developed by a multidisciplinary committee, include seventeen specific recommendations aimed at promoting a balanced diet and overall health.

For a balanced diet of 2,000 kcal, the guidelines suggest consuming 500 grams of vegetables and fruits, 250 grams of cereals, and incorporating pulses, legumes, fish or meat, and milk.



It is recommended to source proteins from food items rather than commercial supplements. The guidelines also advise that sugar intake should be less than 5% of total energy, with no more than 45% of calories coming from cereals and millets, and up to 15% from pulses, beans, and meat. The remaining calories should be obtained from nuts, vegetables, fruits, and milk, with total fat intake not exceeding 30% of total energy.

The National Institute of Nutrition (NIN) in Hyderabad warns that prolonged consumption of large amounts of protein powders or high-protein concentrates can lead to bone mineral loss and kidney damage. Insufficient intake of essential nutrients can disrupt metabolism and increase the risk of insulin resistance and related disorders from an early age.

The rise in consumption of highly processed foods high in sugars and fats, combined with reduced physical activity and limited access to diverse foods, has exacerbated micronutrient deficiencies and obesity. The guidelines emphasize that ultra-processed foods like noodles, breakfast cereals, soup mixes, and cake mixes are unhealthy, even if enriched or fortified with nutrients. It is estimated that 56.4% of India's total disease burden is due to unhealthy diets.

Adopting healthy diets and engaging in physical activity can significantly reduce the risk of coronary heart disease, hypertension, and up to 80% of type 2 diabetes.

According to the International Society of Sports Nutrition (ISSN), athletes with a body weight of 50-100 kg may require between 2,000 and 7,000 calories per day to meet their training needs. For those weighing between 100 and 150 kg, the daily intake could range from 6,000 to 12,000 calories. ISSN recommends that athletes consume at least 2,500 kcal per day, with 5-12 grams of carbohydrates and 1.4-2.0 grams of protein per kilogram of body weight daily. Additionally, fats should constitute 30% of their total daily calorie intake.

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EFFECTS OF DIFFERENT ABDOMINAL EXERCISES ON ABDOMINAL STRENGTH AND ENDURANCE

INTRODUCTION

In recent years, abdominal muscle training has gained increasing popularity, and exercises like “crunches” or “planks” have become an integral part of both fitness and rehabilitation programs.

The abdominal muscles are the muscles forming the abdominal walls, the abdomen being the portion of the trunk connecting the thorax and pelvis. An abdominal wall is formed of skin, fascia, and muscle and encases the abdominal cavity and viscera.

It consists of four main muscles:

- 1) Transversus abdominis
- 2) Rectus abdominis
- 3) External oblique muscles
- 4) Internal oblique muscles

All the abdominal muscles have different muscle fibres orientation and act in all three planes during movements and are linked together by having a common site of connection or by fascia. Actions associated with abdominal muscle control can be complex. A single muscle does not usually work in isolation but in harmony with others.

The abdominal muscles support the trunk, allow movement, hold organs in place, and are distensible (being able to accommodate dynamic changes in the volume of abdominal contents).

The deep abdominal muscles, together with the intrinsic back muscles, make up the core muscles and help keep the body stable and balanced, and protects the spine.

The most common traditional exercises and training methods to enhance abdominal strength and stability employ body weight exercises consisting of static or dynamic contractions in various body positions (e.g., supine, lateral), starting with isolated movements and then continuing through with more complex sequences such as crunches, sit-ups, and planks (prone or lateral).

Correct breathing (especially as it involves the respiratory muscles) is vital to abdominal training because respiratory muscles are directly involved during common core stability exercises. DePalo et al. found that the diaphragm is actively recruited in many resistant training exercises, including sit-ups. Other studies demonstrated that the respiratory muscles are involved in a variety of activities in which respiration is not primarily involved. Because breathing is one of the most basic patterns directly related to human movement, as seen in neonates, inefficient breathing may result in muscular imbalance and motor control alterations that can affect general motor quality.

The aim of this study was to evaluate whether, as compared with a training protocol of common exercises, abdominal training plus breathing exercises would more greatly enhance abdominal strength and endurance.

SUBJECTS AND INCLUSION CRITERIA

All participants gave their consent via an online form after having been informed about the objectives and scope, procedures, risks, and benefits of the study. Participation was voluntary, and withdrawal from the study was permitted at any time. Total number of subjects: 60 [Experimental group or group 1 = 30], [Control group or group 2 = 30]

Inclusion criteria:

- Nonsmokers without pulmonary disease or a history of low back pain
- Gender – Female and Male both
- People willing to participate in the study

Exclusion criteria:

- People with history of any recent fracture/pathology or abdominal/spine surgery
- People involved with a high intensity exercise regime
- People having frequent episodes on low back pain
- Acute or chronic smokers
- Any cardiopulmonary disease

PROCEDURE AND TOOLS

Before the start of the study, all subjects did not engage in any physical activity. The subjects were matched and randomly assigned to two groups. Each group performed the assigned exercise protocol for 20 minutes, 4 times per week. Data were collected before and after 4 weeks of training. No other physical exercise, aside from that specified for the purposes of this study, was performed during the study period.

Study design: An experimental study

Sampling method: Simple random sampling

Sample size: Total 60

Group 1 [EG]: 30 individuals, mean age 21 ± 3 years, height 1.65 ± 8 m, weight 57 ± 9 kg (Female:male=15:15)

Group 2 [CG]: 30 individuals, mean age 21 ± 3 years, height 1.61 ± 12 m, weight 51 ± 9 kg (Female:male=15:15)

Study setting: Government physiotherapy college, Jamnagar.

Study duration: 4 weeks

The American College of Sports Medicine (ACSM) curl-up (cadence) test, Double Leg Lowering test (DLLT), and Isometric Trunk Flexor Endurance test (ITFET), were used to assess abdominal muscle fitness.

1) Timed Partial Curl Up Test: The timed partial curl up test is a standard in the fitness industry and is included here, even though it uses the hook lying position and thus encourages hip flexor activation.

Purpose: Strength test for abdominals.

Position of Patient: Supine in hook lying position on a mat with arms at sides, palms facing down, and the middle fingers touching a piece of tape affixed to the surface parallel to the hand. A second piece of tape is affixed 12 cm (4.7 in) further than the initial tape for those younger than 45 years and 8 cm (3.1 in) further for those 45 years and older

Stand to the side of the patient. Ask the patient to perform a slow, controlled sit up in time, lifting head and scapulae off the mat, while the middle finger reaches to the second tape. If successful, use a metronome set to 40 beats/min to time repetitions. Ask the patient to curl up as many times as possible keeping time with the metronome. The low back should be flattened before curl up. Test: The individual does as many curl ups as possible without pausing, to a maximum of 75.

2) Isometric Trunk Flexor Endurance Test (ITFET):

Purpose: Measure isometric core endurance.

Position of Patient: Sitting on table with wedge supporting the back at angle of 60° to the table. Hips and knees flexed to 90° , with feet stabilised with a strap. Arms are folded across the chest.

Ask the patient to hold the test position when the wedge is pulled back 10 cm. Time effort as soon as the wedge is pulled back.

Terminate test when the patient can no longer maintain the 60° angle independently.

Scoring: Ages 18 to 55 years (mean, 30 years), mean hold time = 178 seconds.

Exercisers held the test 3 times as long as nonexercisers (186 s vs. 68.25 s)

3) The Double Leg Lowering test (DLLT):

Purpose: To assess abdominal muscles and the ability of muscles to maintain the posterior pelvic tilting position against the load (lowering both lower limbs from the vertical position)

Position of Patient: Subject lying in supine, the arms are held across the chest and the head rested on the floor.

The tester places their finger tips underneath the subject's lower back. The subject may bend their knees first to move to the starting position, before straightening the knee joint. The subject aims to sustain the pressure on the tester's fingers under the lower back by contracting the abdominals as the legs are lowered. During the test, if the pressure on your hand is decreased, stop the test and the angle is measured.

The score is the angle of the legs in degrees from the floor.

Below is a guide to scoring for this test :

Angle	Rating
90	very poor, starting position
75	poor
60	below average
45	average
30	above average
15	good
0	excellent, legs horizontal

The two training protocols were administered for 20 minutes 4 times per week for 4 weeks in both groups; all exercises were performed after a standardised 10-minute warm-up.

The EG exercises were focused on achieving and maintaining a proper diaphragmatic breathing pattern for 2–3 seconds during inspiration and 8–10 seconds during expiration, with a vocal sound emitted to induce active deep internal abdominals. To do this, the subject inhales, expanding the lower abdominal region, the side and back of the abdomen, and the lower ribs. The chest is kept relaxed without pushing out the stomach, and the head is aligned with the spine to avoid excessive bending of the spine or body compensations. The exercise sequence is as follows:

EXERCISES FOR EXPERIMENTAL GROUP [EG]:

- 1) GLOBAL MUSCLES STRETCHING POSTURES
- 2) CRUNCHES: 15 repetitions, 2 sets
- 3) CRUNCHES WITH ROTATION: 15 repetitions on both sides, 2 sets
- 4) QUADRUPED-ALTERNATE ARM AND LEG RAISE: 15 second hold, 2 series
- 5) PLANK ON ELBOWS: 15 second hold, 2 series

EXERCISES FOR CONTROL GROUP [CG]:

- 1) CRUNCHES: 15 repetitions, 2 sets
 - 2) CRUNCHES WITH ROTATION: 15 repetitions on both sides, 2 sets
 - 3) QUADRUPED-ALTERNATE ARM AND LEG RAISE: 15 second hold, 2 series
 - 4) PLANK ON ELBOWS: 15 second hold, 2 series
- For statistical analysis, data were obtained before the treatment and after the end of treatment from both the groups. Sit and reach test was scored before and after the intervention.

Mean and standard deviation of Pre and Post-test values of ITFET, DLLT and ACSM Curls up test of Group 1 [EG] and group 2 [CG] was calculated. Data was entered into a personal computer, and all statistical analyses were performed using the Statistical Package for the Social Sciences IBM™ SPSS™ version 25.0. Descriptive statistics such a mean and standard deviation were calculated to describe all the variables. For normal distribution of data, normality test "Shapiro-wilk test" was done.

Normality test

If $p < 0.05$: then the null H_0 hypothesis can be rejected (i.e. the variable is not normally distributed).

If $p > 0.05$: then the null H_1 hypothesis can be accepted (i.e. the variable is not normally distributed).

1. Results were tested for normal distribution using a Shapiro-Wilk test.

	Experimental group (EG)	Control Group (CG)
ITFET	$p=0.003 (P<0.05)$	$p=0.075 (P>0.05)$
DLLT	$p=0.000 (P<0.05)$	$p=0.00 (P<0.05)$
ACSM Curls up test	$p=0.465 (P>0.05)$	$p=0.123 (P>0.05)$

In our data for Group 1[EG] the data for ITFET and DLLT is not normally distributed, data for ACSM Curls up test is normally distributed. For Group 2 [CG] the data for IFET and ACSM Curls up test is normally distributed, data for DLLT is not normally distributed.

2. For within group analysis Wilcoxon test and Paired t test respectively.

Paired t test

Group	Outcome measure	N	Mean	SD	t value	df	p value
Experimental group	ACSM Curls up test	30	-7.23	6.41	-6.17	29	0.000
Control group	DLLT	30	-14.70	45.81	-1.75	29	0.089
	ACSM Curls up test	1.46	30	9.13	0.879	29	0.387

Wilcoxon test

Group	Outcome measure	Z	p value
Experimental group	ITFET	-4.78	0.000
	DLLT	-4.58	0.000
Control group	DLLT	-2.81	0.005

3. We compared the outcome of the above analysis using Mann Whitney test and Independent t test respectively.

Mann Whitney test

Outcome measure	Mann-Whitney U diff	Wilcoxon W diff	Z diff	p value diff
ITFET	266.5	731.5	-2.713	0.007
ACSM Curls up test	392.5	857.5	-0.852	0.394

Independent t test

Outcome measure	N	Mean diff	Std. Error Difference	t value	df	p value
DLLT	30	-8.83	2.82	-3.12	58	0.003

RESULTS

The above analysis suggests -

- Comparison of the pre and post intervention values (Wilcoxon signed rank test and Paired t test) of the outcome measure showed there was statistically significant difference in all test values in the Experimental group. For the control group significant difference is only seen in the ACSM Curls up test.
- On comparing both group values (Mann Whitney test and Independent test) showed that there was no statistical difference between the two groups in terms of ACSM Curls up test, but there is statistical difference seen in ITFET and DLLT.

DISCUSSION

The main finding of this study is that, compared with traditional exercises, a program including core exercises performed with a focus on muscular chain stretching and breathing techniques can lead to greater improvement in abdominal muscle endurance and muscle strength to some extent. Furthermore, the results suggest that a series of exercises performed with a vocal sound emission can be a valid strategy to enhance proper diaphragmatic breathing patterns and deep internal abdominal activation much more than in traditional abdominal routines in which people tend to hold their breath or use chest wall respiration.

Our results show that, while traditional core exercises can improve muscular strength and endurance, improvements are greater with muscular chain stretching in combination with breathing techniques.

As reported in previous studies, proper diaphragmatic breathing is directly linked to better functional movement, but combining proper breathing with global stretching postures can produce a greater effect. Regarding the biomechanical aspects of breathing, the expiration phase promotes active recruitment of the abdominal muscles, contrasting the natural elevation of the rib cage (induced by raising the arms overhead); to the contrary, elevating the arms raises the anterior chest wall, makes the thoracolumbar column hyperlordotic, and puts the diaphragm in an oblique position that inhibits its proper function. During exhalation, the thoracolumbar spine returns to a more neutral position (opposing the previous hyperlordosis), and the diaphragm is more horizontal without posterior pelvic tilt. The subject should inhale to expand the lower portion of the abdominal region, the side and back parts of the abdomen and lower ribs, keeping the spine aligned and the chest relaxed. Using a correct diaphragmatic breathing pattern promotes co-contraction of the abdominal muscles in the so-called bracing technique, which provides trunk stiffness and stability. When focusing on diaphragmatic breathing, it is important not only to reestablish a correct respiratory pattern but also to ensure lumbar spine stabilisation by increasing intra-abdominal pressure and activation of the core structures to transfer forces from the centre of the body to the lower extremities. To produce an economic breathing pattern, all joints must be centred in a stable position to involve all muscular chains. The head, eyes, and spinal curves should all be aligned with the pelvis and the hips down to the knees and feet. This can be achieved with proper diaphragmatic breathing and adequate muscle tone distribution (as can be trained with EG exercises).

LIMITATIONS

The present study has several limitations. The sample size was small, and the subjects did not belong to a specific population. Electromyographic assessment of the abdominal muscles was not performed.

In addition, the control group exercise protocol was home based, the experimental group performed the exercises under observation.

CONCLUSION

In conclusion, EG exercises that incorporate correct breathing patterns and body flexibility offer an alternative to traditional abdominal exercises. As such, they may be useful for coaches or physical therapists when selecting core exercises to improve overall abdominal fitness and to retrain correct diaphragmatic breathing. Further research is needed to compare abdominal breathing with other core exercises in order to clarify the combination of breath and abdominal exercises in treating painful disorders (low back pain, neck pain) and improving motor control in fitness and rehabilitation programs which was not possible for this research due to limited time limit.





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ANALGESIC EFFECTS OF DRY NEEDLING AND ACTIVE RELEASE ON UPPER TRAPEZIUS MUSCLES IN NECK PAIN PATIENTS



**DR. ANITA SINGH
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Neck Pain is a most common musculoskeletal disorder affecting individuals of any age group due to poor head posture and can occur when a person works for a long time or at high intensity. The prevalence of developing neck pain is 70%, posing future challenges to society. (1) A common cause of neck pain is development of Myofascial trigger points (MTrp) and unbalanced soft tissue around the head and neck structures that can limit the Range of Motion (ROM). (2-7)

MTrp is a condition, which is associated regional pain and muscletenderness characterized by the presence of hypersensitive nodules within taut bands of skeletal muscles(8). Simons et al. defined MTrp as the presence of exquisite tenderness at a nodule in a palpable taut band of muscles. They are able to produce referred pain, either spontaneously or on digital compression and it is also reducing the joint ROM(9). Although MTrps are found in all muscle groups, they are more prevalent in the upper quarter postural muscles, especially the upper trapezius muscles and can cause local pain and may distribute the neck and shoulder girdle function in patients with neck pain(10,11,12). Therefore, the diagnosis and treatment of MTrps in muscles around neck especially upper parts of trapezius muscles is important with the aim of restoring soft tissue function or mobility to the joints in the patients with neck pain.

Physiotherapy is often considered the first treatment option for people with neck pain. Different therapeutic strategies, like Cervical spine mobilization and manipulation(13), Education(14), Thoracic manipulation(15) or Therapeutic exercises(16) have shown to be effective for the treatment of neck pain. However, the evidence supporting the use of other therapies proposed for the management of neck pain such as Dry needling and Active release technique and their combined effect is still limited.

Dry needling is invasive methods to treat MTrps. During Dry needling, a needle is inserted directly into the trigger points in the muscles without injecting a substance. Cummings TM et al stated that Dry needling consists of the insertion of needle in the active trigger points, by means of which an analgesics effect is obtained through the mechanical stimulus and the neurophysiological effect associated with the introduction of needle. Dommerholt J reported that Dry needling may mechanically cause the local sarcomere to stretch and the cytoskeleton structures inside the MTrps to contracts. It stimulates A-delta fibers and activates enkephalin-producing neurons in the dorsal horn, which leads to the reduction and suppression of pain. This is an effective way to reduce the somatic pain and disabilities that are associated with the MTrps in neck muscles(17). Active release technique (ART) is a manual therapy for the recovery of soft tissue function that involves the removal of scar tissue, which can cause pain, stiffness, muscle weakness and abnormal sensations including mechanical dysfunction in the muscle, myofascia and soft tissue(18). The effectiveness of ART has been reported for carpal tunnel syndrome, Achilles tendinitis, tennis elbow, all of which involve soft tissue near joints in the distal part of body(19).

Dvord J et al stated that soft tissue injuries is the cause of pain in 87.5% of neck pain cases and ART is performed directly on the injured soft tissue to relieve pain. It is also effective in reducing pain and increasing pain in patients with a partial tear of the supraspinatus tendon(20).

Most patients with neck pain experience pain and movement limitations as a result of soft tissue impairment in neck.

No previous studies have assessed how ART in combination with Dry needling can improve ROM and decrease pain in patients with neck pain. Also there are no literature available that shows which intervention should be given first during treatment of neck pain, i.e, either ART should incorporate prior to Dry needling or Dry needling should incorporate prior to ART to assess their combined effects.

Literatures are available which shows the effectiveness of both Dry needling and ART either individually/isolate or with some other techniques but there's no literature/research comparing the effectiveness between technique ART and Dry needling in patients with upper trapezius MTrps.

Therefore, the purpose of this study is to compare the combined effects of both techniques and assess which intervention should be given first on pain and ROM in upper trapezius MTrps with the aim of elucidating additional information on their effects and identifying more efficient treatments that can be used in clinical Settings.

NEED FOR STUDY/RESEARCH GAP

Neck pain is one of the most common health-related problems affecting economic productivity in modern society and researches into optimal treatment for neck pain is lacking. Previous studies have reported the application of Dry needling and ART with other therapeutic interventions for the treatment of neck pain but there are no studies available as per our knowledge to analyse the combining effect of Dry needling and ART in the treatment of neck pain or which technique is better in showing the best analgesic effect and in improving ROM in patients with neck pain.

So, the need for this study is to compare the influence of both techniques (DN & ART) on upper trapezius MTrps as a useful intervention in the management to reduce neck pain and increase ROM.

MATERIALS AND METHODS

1. Study Design: - Randomised Control Trial.
2. Study Setting: - Study will be execute in the Parihar physiotherapy centre , Kanpur U.P., under the supervision of Dr. S. D. Singh Parihar and under the guidance of Dr. Ashfaque Khan.

3. Sample Size: - n=40. The subjects were recruited from the Parihar physiotherapy centre, Kanpur.

4. Study Duration:- Total study duration will be 1 weeks. Individual will receive treatment for the duration of 1 weeks of alternate days and one week of follow-up after the termination of intervention.

5. Subjects:- The participants with clinical diagnosis of neck pain associated MTrps of upper trapezius muscles, who will fulfil the predetermined inclusive and exclusive criteria are selected and divided into 4 groups by simple random sampling. Groups are named as group A, B, C and D.

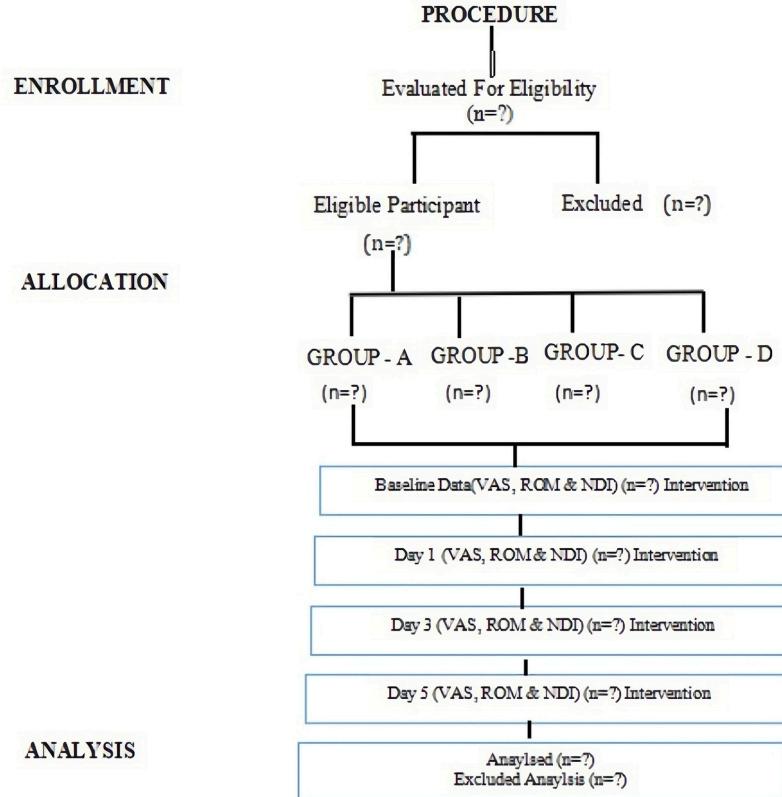
6. Outcome Measures :-

a) Primary Outcomes -

- Pain and Degree of pain can be assessed by using VAS.
- Status of MTrPs as determined by digital palpation.
- Trigger points are rated as - 1. Active (Spontaneously painful).
- Latent (Requiring palpation to reproduce the pain).
- Resolved (no palpable nodule).

b) Secondary Outcomes -

- Range of Motion can be assessed by using Universal Goniometer.
- Neck Disability can be assessed by using Neck Disability Index.



RESULTS

VARIABLES	GROUP-A	GROUP-B	GROUP-C	GROUP-D
Pre VAS	9.10 ± 0.74	8.80 ± 0.92	9.20 ± 0.79	9.10 ± 0.74
Post VAS Day-5	3.40 ± 0.52	5.42 ± 0.52	3 ± 0	6.40 ± 0.70
Pre ROM	74 ± 4.59	75.5 ± 3.69	75 ± 3.33	74.50 ± 2.84
Post ROM Day-5	90 ± 0	87 ± 2.58	90 ± 0	84 ± 3.94
Pre NDI	88.6 ± 12.03	83.3 ± 13.15	86 ± 13.03	86.8 ± 11.003
Post NDI Day-5	6.2 ± 8.7	40.52 ± 21.18	10 ± 8.89	42.96 ± 21.200
P- value	p < 0.0001	p < 0.0001	p < 0.0001	p < 0.0001

Group-A: Dry needling; **Group-B:** Active Release Technique; **Group-C:** Combined intervention on both (D.R. + A.R.T.) and **Group-D:** Control Group.

CONCLUSION

Analgesic Effects of Dry Needling and Active Release Technique on Upper Trapezius Muscles in Neck Pain Patients.

The data collection of this study was conducted at Parihar Physiotherapy Centre under the supervision of Dr. S. D. Singh Parihar.

1. The result of this study suggested that, after 1st & 2nd weeks of Dry Needling, Active Release Techniques and combined intervention of both Dry Needling and Active Release Techniques on patients of neck pain resulting from upper trapezius trigger points shows a significant effects on pain, NDI and painful Range of Motion.

2. The result also showed that for the management of active trigger points of upper trapezius, Active Release Techniques can be effective and for the management of latent trigger points of upper trapezius, Dry Needling can be effective.

3. The result also suggested that combined intervention of Dry Needling and Active Release Technique is more effective than single intervention of either Dry Needling or Active Release Technique.

HOW EFFECTIVE CLINICAL REASONING EMPOWERS PATIENTS AND IMPROVES PHYSIOTHERAPY OUTCOMES



DR.
MOHAMMED
AMJAD KHAN
(PT)

Introduction

Physiotherapy is a dynamic field dedicated to restoring movement, function, and overall well-being. But at the heart of this practice lies not just technical expertise, but a powerful tool that guides informed decisions: clinical reasoning. It's a continuous cycle of inquiry, analysis, and adaptation, ensuring each patient receives a personalized approach to recovery.

The Symphony of Clinical Reasoning

Imagine a symphony where the patient's history forms the melody, the physical examination adds harmony and the physiotherapist's critical thinking acts as the conductor. Clinical reasoning orchestrates these elements into a cohesive treatment plan designed to address the root cause of the patient's dysfunction.

The process unfolds in a cyclical fashion

1. Data Collection:

- History taking: This involves a comprehensive interview to understand the patient's presenting complaint, medical history, lifestyle factors, and social determinants of health.
- Physical examination: Through various techniques, the physiotherapist evaluates movement patterns, joint integrity, muscle strength, sensation, reflexes, and other aspects relevant to the patient's condition

2. Hypothesis Generation:

Based on the gathered information, the physiotherapist formulates potential explanations for the patient's condition. These hypotheses should be grounded in current research evidence and consider the biopsychosocial model of health, encompassing biological, psychological, and social factors.

3. Evaluation and Refinement:

The physiotherapist employs specific tests, observations, and sometimes even special investigations to confirm or refute the initial hypotheses. This stage might involve specific clinical tests, imaging referrals, or collaboration with other healthcare professionals for a more comprehensive picture.

4. Treatment Planning:

Once a diagnosis is established, the physiotherapist designs a treatment plan tailored to the patient's specific needs and goals. This plan may include manual therapy techniques, therapeutic exercise prescription, education on pain management and self-care strategies, and potentially adjunctive therapies (e.g., modalities like ultrasound or electrical stimulation).

5. Reassessment and Adaptation:

The physiotherapist continuously monitors the patient's progress and adjusts the treatment plan as needed. This iterative process ensures the treatment remains relevant and effective throughout the rehabilitation journey.

The Power of Effective Clinical Reasoning

Mastering this intricate dance of information gathering, analysis, and intervention planning unlocks numerous benefits for physiotherapy care:

- Improved Diagnostic Accuracy: Clinical reasoning leads to a deeper understanding of the underlying cause of dysfunction. By critically analyzing data and formulating well-defined hypotheses, physiotherapists can avoid mistaking symptoms for the root cause and design targeted treatments that address them

Individualized Care: Every patient presents with a unique story. Clinical reasoning allows physiotherapists to move beyond a one-size-fits-all approach. By considering the patient's specific needs, limitations, and goals, therapists can tailor treatment plans for optimal outcomes.

- **Enhanced Patient Engagement:** When patients understand the rationale behind their treatment plan and actively participate in decision-making, they become more invested in their rehabilitation journey. This collaborative approach fostered by clinical reasoning promotes ownership and empowers patients to actively participate in their recovery.

- **Adaptability:** The human body is a complex system, and situations can arise that deviate from textbook presentations. Strong clinical reasoning skills equip physiotherapists to think critically, adapt their approach on the fly, and adjust treatment plans as needed based on patient responses.

Incorporating Clinical Reasoning into Practice: For aspiring and seasoned physiotherapists alike, fostering effective clinical reasoning requires a dedicated effort. Here are some practical steps to integrate this vital skill into daily practice:

Build a Strong Knowledge Base: Staying current with the latest research findings and evidence-based practices is critical. A strong knowledge base allows physiotherapists to interpret data, formulate accurate hypotheses, and select appropriate interventions

Refine Active Listening Skills: Pay close attention to the patient's narrative. Listen not just to their symptoms, but also to their past experiences, current limitations, and desired outcomes. This information provides valuable clues for refining hypotheses and guiding the assessment process.

- **Hone Observation Skills:** Develop your ability to identify subtle details during physical examinations. Look for deviations in movement patterns, posture, muscle function, and joint integrity. These observations can significantly impact your clinical reasoning process and lead to more accurate diagnoses.

- **Utilize Clinical Decision-Making Frameworks:** Several frameworks can structure the clinical reasoning process. Some examples include the International Classification of Functioning, Disability, and Health (ICF) and the biopsychosocial model. These frameworks offer a systematic approach to analyzing patient data and formulating treatment plans.

- **Embrace Reflection:** Regularly evaluate your own decision-making processes. Reflect on successful cases and instances where the initial plan required adjustments. Consider what information was most helpful, what might have been missed, and how you could approach similar situations in the future. Reflecting on these experiences helps refine your clinical reasoning skills and identify areas for improvement.

Seek Collaboration and Continuous Learning: Don't hesitate to consult with colleagues, other healthcare professionals, or refer to specialists when needed. Working together allows for a broader perspective and ensures the patient receives the best possible care. Additionally, commit to continuous learning through professional development courses, workshops, and staying updated with the latest research.

- **Embrace the Unknown:** Sometimes, patients present with complex or atypical presentations. Don't be afraid to acknowledge uncertainty and work collaboratively with the patient to navigate the path forward. Honesty and transparency build trust, and a willingness to explore different avenues showcases your commitment to finding the most effective approach.

Conclusion: Clinical reasoning in physiotherapy is not a rigid formula, but a dynamic process. Therapists continuously learn and adapt their approach, tailoring treatments to each patient's unique needs. This ongoing pursuit of knowledge fosters sharper critical thinking, leading to accurate diagnoses and personalized plans for faster recovery and improved well-being. Ultimately, clinical reasoning empowers both patients and therapists, making them partners in the journey towards optimal health.

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