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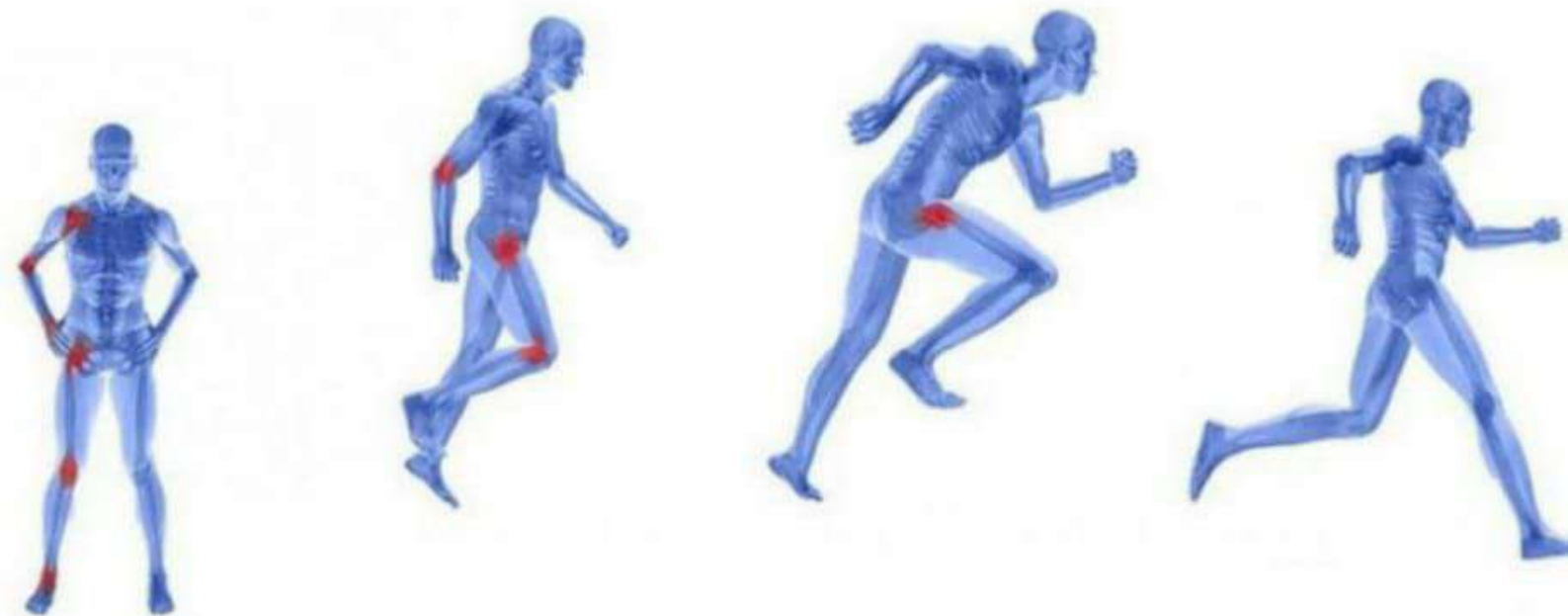
**University with Graded Autonomy Status**

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Periyar E.V.R. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.



## FACULTY OF PHYSIOTHERAPY



# PHYSIO MAG

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## ROLE OF PHYSIOTHERAPY IN MANGLED HAND



**A,KAVITHA**

**II Yr BPT**

**'E' SEC**

### **ABSTRACT:**

Mangling hand injuries are high energy complex conditions that are challenging to manage. They require careful planning and meticulous execution of treatment. A clear set of anatomical and functional goals at the outset guides the planning. The first surgery is crucial to ensure good vascularity to the salvaged tissue, prevent infection and achieve bony stabilization. Re-look surgery and definitive reconstruction can then follow. Post-operative therapy is an important component of treatment. Despite best efforts, outcomes are variable in these devastating injuries. Secondary procedures and provision of prostheses will do



much to improve the patient's body image and limb function. This article provides a set of principles that will guide the assessment and treatment of such injuries.

## **INTRODUCTION:**

The hand is always exposed to environment during use and easily at risk of injury. These injuries occur in the setting of work, home accidents, assault, and motor vehicular type accidents. Mangling or mutilating hand injuries are commonly encountered in different societies as mechanization provides risks for these types of injuries. These injuries occur as a result of high-energy trauma in a young and otherwise healthy patient population.



The mangling hand injury provides one of the greatest challenges to the hand surgeon. The variability of the tissues injured and lost, and the requirement for complex reconstruction to restore and salvage hand function, requires careful planning and meticulous execution of treatment. The ultimate aim is to restore sufficient function, so that the patient can perform their activities of daily living, and return to work.

## **WHAT IS A MANGLING HAND INJURY?**

The definition of mangling or mutilating hand injury is imprecise. The origins of the term provide a useful start point. “Mangled” has its origins from old French meaning “cut to pieces,” and mutilating from Latin meaning “to cut or lop off,” and mutilus “maimed”. Together, the terms indicate an injury with significant loss of tissue and loss of function





From the opposite viewpoint, the minimal components required for reasonable hand function provides a reference point beyond which a hand injury might be considered mutilating. Pinal addressed the issue of what makes an “acceptable hand”. He suggests that one with three fingers with near normal length, near normal sensation, and a functioning thumb would constitute an “acceptable hand”. This is a useful starting point to consider the assessment and management of a mangling hand injury. An injury resulting or potentially resulting in a hand with a function less than an “acceptable” hand would be a mangling injury, or what the author terms a “major hand injury”.

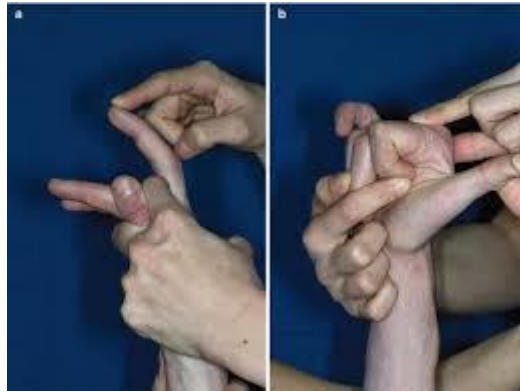
#### **DECISION POINTS:**

After the physical examination and review of the radiology, the surgeon should have a plan with the ultimate outcome in mind. A clear plan provides a road map for the surgeon, treating team and patient to follow. Some modifications may be necessary as the clinical course progresses.



#### **THERAPY:**

The hand therapist is a key player in the management of the mutilating hand injuries. Post-operative therapy contributes much to the outcome. Referral is made immediately after the first surgery. This allows an early assessment by the therapist, and early mobilization of the unaffected joints to prevent stiffness. This will proceed on to definitive therapy of the injured part once surgery is completed. The therapist often sees the patient more frequently and for longer periods of time than the physician in the post-operative period. Good communication between the physician and therapist enables optimization of treatment and early management of complications or problems.



### **ROLES OF THE HAND THERAPIST:**

- Hands -on / stretch / splint
- Teach to adapt
- Family support (wound care, exercises)
- Wound monitor / Problem detector
- Counselor
- Motivational coach
- Advisor to surgeon
- Liaison between patient and work

### **HANDS are complex:**

- ANATOMY
- VARIETY OF INJURIES / PATHOLOGY
- COMPLEX SPLINTS/BRACES
- MULTIPLE PROTOCOLS
- Many hand problems are WELL beyond the scope of typical PT/OR

Complex hand surgeries can be compromised by an under-qualified therapist

- Actual examples
- Rupture of tendon repair
- Inappropriate suture removal
- Lack of joint range of motion
- Bandages too tight ☐ Amputation
- Ineffective Splints ☐ re-fracture



- Failure to notice problems (infection?)

#### **POST-OP DAY 6:**

"Therapy is mandatory at this point in time, we will initiate range of motion of all joints of all digits with the exception of the middle, ring and small finger metacarpal phalangeal joints. Swelling reduction techniques will be instituted".

Detailed therapy prescription written.

#### **POST OP DAY 14:**

"Unfortunately, he has not started therapy despite a very clear therapy prescription, which was written on 11/08. Additionally, we have been regularly trying to contact the patient's case manager starting on Monday, November 11. We have left several messages, and we unfortunately have not yet heard back from the case manager. The patient states that he was contacted today that he has a therapy appointment set up on 11/25."

- First therapy appointment – 21 days after injury!!

#### **Between 1-2 Months after injury:**

- ❖ 2-3 therapy visits per week
- ❖ 2 months after injury
- ❖ "The pins have subsequently been removed. He has developed expected stiffness. I recommended continued therapy, and continued work restrictions with no use of the right hand at all".

#### **Between 3-4 months after injury:**

NO therapy appointments ???

"At the last scheduled office visit, he again did not have a certified medical Spanish translator... which has been a problem in the past.

Additionally... his last therapy appointment was 3-4 weeks ago The patient reports ... the case manager "went on vacation" and further therapy was never approved.

The patient feels that "he has not made much progress in terms of flexibility and, in fact, he thinks that he has lost some over the last few weeks."

"I am greatly disturbed and concerned ... this is dramatically compromising his potential for good function in the future. I now feel he will require surgery in the future... but aggressive and continued therapy will help to potentially minimize the need for this."

- ❖ Therapy not started for TWO MORE WEEKS!
- 5 months after injury:
- Back to operating room for scar release
- NEW CASE MANAGER
- THERAPY 3x/week
- 7 months after injury: MMI, rate and release.

“I do feel that a substantial delay in starting therapy early in the course of his treatment led to a significant long-term impairment and long-term compromise of his final result.”

### **Complications and Additional Procedures**

- 5 months – Revision of fixation of forearm fracture (non-union)
- 11 months – Thumb fusion, Small finger contracture release, 1st web space opening
- 16 months – Removal hardware from hand
- 18 months – MMI – medium work

### **SECONDARY PROCEDURES:**

The need for secondary procedures following a mutilating injury is high. This should be communicated at the outset to the patient to temper expectations and to involve the patient in the treatment process.

### **Hand Therapists:**

- 1-5 times per week
- I request a CERTIFIED HAND THERAPIST
- There are other options, but safest best CHT
- If not at Ortho Carolina, then with a CHT I know
- I don't hesitate to switch therapists
- All hand therapists have my cell phone number
- AS IMPORTANT AS THE SURGERY!!!! (or more!)

### **MENTAL HEALTH:**

- Adjustment disorders, depression, PTSD
- Important to recognize/identify
- Critical factor in patient recovery and outcome
- Short and long-term
- Men have more difficulty expressing
- Referral to mental health professional when appropriate
- Part of the overall care of the injured patient

### **PROSTHESES:**

Following a mutilating injury, the option for provision of a prosthesis after final surgical reconstruction is an important and often overlooked aspect of treatment.[43] In the upper limb, the prosthesis can provide function in terms of grasp, and help restore the patient's

body image. Depending on type of prosthesis, the relative contribution to each function varies. Uses ,

- Immediate fit improves outcome
- Can improve body image/confidence
- Encourages patient to use hand
- I like prosthetist visit day 1!
- Acceptance is important
- Costly
- Wear and tear
- Replacements needed (lifespan)

### **Return to work:**

- Generally, no work until:
- Acute pain resolved
- Acute swelling resolved
- Early wound healing
- I advocate early return to work when reasonable
- “Deskwork”
- Allows for limb elevation on desk
- Important to set/adjust expectations/motivation
- I explain EARLY the diff. b/w “restriction” and “disability”
- I explain EARLY that return to work may be interrupted
- Additional surgery
- Complications
- Setbacks
- Return to work depends on job and modified duty available
- Compliance w/ modified work is important
- I struggle with this
- “My boss makes me do it anyway.”



### **OUTCOMES:**

- Multiple factors:
- Injury related
- Treatment related
- Patient factors:
- Age
- Health
- Hand dominance
- Occupation
- PSYCHOLOGICAL MAKE-UP AND MOTIVATION
- There is no good standardized assessment system
- Severity of original injury plays huge role
- An experienced reconstructive hand surgeon is essential
- THERAPY

### **My Work Comp Wish List for the “Mangled Hand”**

- Basic understanding of complexity of injury
- No delay in therapy, immediate referral to CHT
- Encourage patient to attend and participate
- THIS WILL DECREASE TOTAL DURATION OF TREATMENT AND PERIOD OF DISABILITY
- Working with me to understand job situation
- Expect complications and additional surgery
- Awareness of psycho-social aspects

# **ACUTE EXERCISE IMPACTS AhR AND T CELLS – EXPLORATORY RESULTS FROM A RANDOMIZED CROSS – OVER TRIAL COMPARING ENDURANCE VERSUS RESISTANCE EXERCISE**

**- SEEMA.N  
BPT 3rd year D sec**

## Abbreviations

1-RM One-repetition maximum

AhR- Aryl hydrocarbon receptor

EE- Endurance exercise

IDO- Indoleamine 2,3-dioxygenase

KA Kynurenic acid

KYN Kynurenine

MFI Mean fluorescence intensity

NK-cell Natural killer cells

PBMCs Peripheral blood mononuclear cells

PD-1 Programmed cell death protein

1 QA Quinolinic acid

RE Resistance exercise

RT Room temperature

SD Standard deviation

SEM Standard error of the mean

TRP Tryptophan

## Purpose :

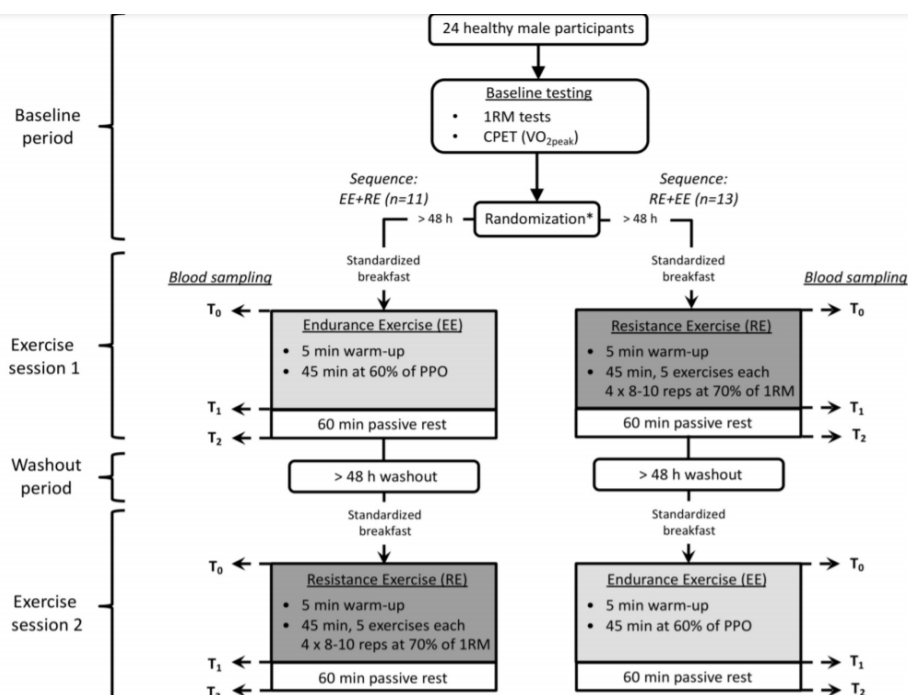
The programmed cell death protein 1 (PD-1) has become a promising target in cancer immunotherapy. PD-1 expression of T-cells may be increased via the exploitation of aryl hydrocarbon receptor (AhR) signaling with kynurenine (KYN) as a ligand. Since exercise affects KYN metabolism, we exploratory investigated the influence of acute exercise bouts on AhR and PD-1 levels of T-cells.

## Method

- In this study, 24 healthy males (age:  $24.6 \pm 3.9$  years; weight  $83.9 \pm 10.5$  kg; height:  $182.4 \pm 6.2$  cm) completed a single bout of endurance exercise (EE) and resistance exercise (RE) in a randomly assigned order on separate days.
- Blood samples were drawn before (t0), after (t1), and 1 h after (t2) both conditions.



- T-cell populations, the level of cytoplasmic AhR, and surface PD-1 were assessed by flow cytometry.
- On a separate testing day, participants performed a baseline assessment of strength and endurance capacity to define individual intensities for both exercise bouts.
- To assess endurance capacity, an incremental exercise test on a stationary bicycle ergometry was performed until exhaustion.
- To assess strength capacity, participants conducted a one-repetition maximum (1-RM) test on exercise machines (Cybex International) in the following order: chest press, lat pull, leg curl, leg extension, back extension.
- The total strength value was calculated as the mean of all five 1RM scores. Both exercise sessions were conducted on separate testing days with at least 48 h in between each day. Both sessions lasted 50 min and were conducted between 8 and 11 AM.
- Nutritional intake was kept similarly before both sessions.
- Participants were allowed to drink water ad libitum.
- The room temperature was 21 °C.
- The EE session consisted of 60% peak power output achieved in the baseline testing for 45 min following a 5 min warm-up period.
- The RE session consisted of four sets of 8–10 repetitions at 70% of 1RM at each machine. Blood samples were collected immediately before (t0), immediately after (t1), and 1 h after (t2) each bout of exercise.



## Limitations

- This study investigated the influence of acute exercise on the AhR-PD-1 axis, exposing a new promising mechanism of exercise immunology.

- Especially since PD-1 is a popular target in cancer immunotherapy, this mechanism might play a pivotal role for exercise-induced benefits in supportive cancer therapy and beyond.
- Due to the acute exercise protocol with all measurement time points within 2 h, a passive control group is not a requirement, however, it should be mentioned as a limitation.
- Furthermore, the comparability of the used EE and RE sessions is questionable.

	<b>RE+EE (n=13)</b>	<b>EE+RE (n=11)</b>	<b>Overall (n=24)</b>
<i>Anthropometric and demographic characteristics</i>			
Age (years)	24.8 ± 4.8	24.4 ± 2.7	24.6 ± 3.9
Height (cm)	182.3 ± 6.8	182.5 ± 5.4	182.4 ± 6.2
Weight (kg)	81.6 ± 10.7	86.6 ± 10.1	83.9 ± 10.5
BMI (kg/m <sup>2</sup> )	24.5 ± 2.1	26 ± 3.3	25.4 ± 2.7
Smoking status (yes / no)	2 / 11	4 / 7	6 / 18
<i>Performance characteristics</i>			
$\dot{V}O_{2peak}$ (ml/kg/min)	48.8 ± 8.0	47.8 ± 6.9	48.3 ± 7.4
HR <sub>pre</sub> (bpm)	78.8 ± 8.0	78.8 ± 8.6	78.8 ± 8.1
HR <sub>max</sub> (bpm)	186.8 ± 7.3	184.5 ± 6.6	185.6 ± 7.0
La <sub>pre</sub> (mmol/l)	1.1 ± 0.6	0.8 ± 0.2	1.0 ± 0.5
La <sub>post</sub> (mmol/l)	10.0 ± 2.0	10.2 ± 1.3	10.1 ± 1.7
RER <sub>max</sub> ( $\dot{V}CO_2/\dot{V}O_2$ )	1.14 ± 0.0	1.16 ± 0.0	1.15 ± 0.0
PPO (W)	327.7 ± 68.1	336.4 ± 44.6	331.7 ± 57.5
Watt/kg	4.0 ± 0.6	4.0 ± 0.7	4.0 ± 0.6
1RM Chest press (kg)	109.7 ± 25.1	116.8 ± 17.6	113.3 ± 22.1
1RM Lat pull (kg)	99.5 ± 22.2	103.5 ± 21.4	102.0 ± 21.5
1RM Leg curl (kg)	72.5 ± 10.1	76.8 ± 16.7	74.1 ± 13.2
1RM Leg extension (kg)	115.0 ± 26.1	122.7 ± 23.8	120.9 ± 24.8
1RM Back extension (kg)	100.3 ± 21.6	100.0 ± 20.1	100.9 ± 20.4
Total strength value (kg)	99.7 ± 17.9	104.5 ± 14.2	101.9 ± 16.2

	Overall mean exercise intensity (n=24)
<i>Resistance Exercise</i>	
Chest press (% of 1RM $\pm$ SD)	68.8 $\pm$ 1.7
Lat pull (% of 1RM $\pm$ SD)	67.5 $\pm$ 5.0
Leg curl (% of 1RM $\pm$ SD)	65.3 $\pm$ 5.0
Leg extension (% of 1RM $\pm$ SD)	70.5 $\pm$ 6.0
Back extension (% of 1RM $\pm$ SD)	67.5 $\pm$ 7.0
<i>Endurance exercise</i>	
Heart rate (% of HR <sub>max</sub> $\pm$ SD)	88.2 $\pm$ 5.3
Power output (% of Watt <sub>max</sub> $\pm$ SD)	57.0 $\pm$ 5.6

*1RM* One-repetition maximum (kg); *SD* Standard deviation; *HR<sub>max</sub>* Maximal heart rate (bpm); *Watt<sub>max</sub>* Peak power output (W)

### Discussion

- Acute exercise is known to have a profound impact on immune cell homeostasis.
- Using an exploratory approach, we investigated whether acute bouts of exercise impact cytoplasmic AhR levels and PD-1 expression on CD8+ T-cells.
- Especially EE was observed to impact both AhR levels and PD-1 expression.

### Conclusion

- We analyzed the level of surface PD-1 and cytoplasmic AhR following acute physical exercise for the first time.
- Especially EE was observed to impact both AhR and PD-1 levels, undermining its role as the AhR-PD-1 axis modulator.
- These results provide new insights into the impact of exercise on AhR-signaling, which could potentially be relevant for various chronic diseases.

# PHYSIOTHERAPY MANAGEMENT IN ICU PATIENT

AISHWARYA B

BPT III YEAR D SECTION

## EXAMINATION OF THE CHEST:

1. Inspection
2. Palpation
3. Percussion
4. Auscultation



## ASSESSMENT OF THE PATIENT:

- Checking whether the patient is conscious or not.
- Read the case sheet of the patient.
- Note the temperature
- Assess the type of mode of ventilator used for the patient.

### 1. INSPECTION:

- Chest movement
- Clubbing
- Cyanosis
- AP and lateral chest diameter
- kyphoscoliosis

### 2. PALPATION:

- Confirm all inspectory findings
- Tenderne
- Rib Fracture
- Crepitus
- Tracheal deviation

### 3. PERCUSSION:

- ✓ Dullness
- ✓ Normal
- ✓ hyperresonant

### 4. AUSCULTATION:

Breath sounds- Vesicular, bronchial

Added breath sounds

- a. Wheeze
- b. Crackles

### GOALS:

- ✓ .Pain relief
- ✓ .To prevent accumulation of secretions
- ✓ .To mobilize and remove secretions
- ✓ .To teach proper method of breathing pattern and effective coughing or huffing
  - .To mobilize the thorax and shoulder girdle and teach the postural awareness
- ✓ To teach relaxation
- ✓ To improve functional capacity by functional training programme
- ✓ To advice the home programme



### TREATMENT TECHNIQUES USED BY PHYSIOTHERAPIST IN THE ICU:

- Positioning
- Mobilization
- Manual hyperinflation
- Percussion, vibration, shaking
- Cough/Huff
- Suction
- Breathing exercises



### **POSITIONING:**

### **AIMS:**

- . Increase the lung volume
- . Reduce work of breathing
- . Minimize the work of heart
- . Enhance mucociliary clearance

### **HANDLING A CONSCIOUS PATIENT:**

- . 2 to 3 people are needed to turn a patient
- . Ensure sufficient slack in lines and tubes
  - If possible disconnect the patient from ventilator or tracheal manually
  - Turn the patient smoothly and check the lines, patient comfort and observe the motions

### **MOBILISATION:**

- This technique helps to maintain or restore normal fluid distribution in the body
- It reduces the effect of immobility and bed rest

### **MANUAL HYPERINFLATION:**

- It is one of the technique where there is involvement in disconnecting the patient from ventilator
- And inflating the lungs with a large tidal volume
- Bagging can be used as a technique to hand ventilate a patient or during physiotherapy

### **PERCUSSION:**

- It is a manual technique used to increase airway secretions



**VIBRATION:**

- It is performed by vibrating or compressing the chest wall.
- Pressure is applied in the same direction in which chest is moving

**SHAKING:**

- It is more vigorous form of vibrations
- Applied during exhalation using an intermittent bouncing maneuver coupled with wide movement of therapist hand

**SUCTION:**

- In unconscious patient and in patient with depressed cough
- Suction should not be done routinely, but only on demand
- Every 2 hourly suctioning should be done
- Never prolong the procedures

**COUGHING:**

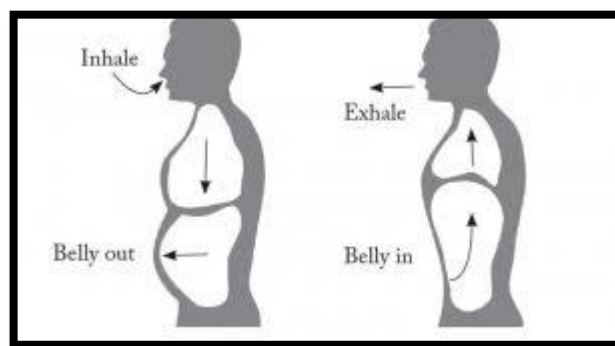
- To keep the lungs clear from secretions
- Procedure:
  - Evaluate the patient and place the patient in relaxed forward bending neck slightly flexed
  - Teach controlled diaphragmatic breathing
  - Demonstrate sharp double cough and ask the patient to repeat
- Precaution:
  - Never allow the patient to suck air in by gasping

**HUFFING:**

- Huff is a rapid force exhalation without maximum effort
- Glottis remains open
- It requires less effort than coughing

#### **BREATHING EXERCISES:**

- **GOALS:**
- Assist removal of secretions
- Improve respiratory muscle strength and endurance
- Increase thoracic mobility and tidal volume
- Promote relaxation
- Teach the patient how to deal with shortness of breath attack
- Improve patient's overall functional capacity



- **TYPES:**
- Diaphragmatic breathing
- Ventilatory muscle training
- Segmental Breathing
- Glossopharyngeal Breathing
- Pursed lip Breathing

## EXERCISE INTERVENTIONS IMPROVE SOME WALKING OUTCOMES IN PEOPLE WITH PARKINSON'S DISEASE

BHAVASHRI. R

BPT 3rd Year "D" sec

- **Parkinson's disease (PD)**, or simply **Parkinson's** is a long-term degenerative disorder of the central nervous system that mainly affects the motor system.
- **Symptoms:**

Common Symptoms



- Tremor or the involuntary and rhythmic movements of the hands, arms, legs and jaw.
- Unsteady walk or balance.
- Depression or dementia
- Muscle rigidity or stiffness of the limbs – most common in the arms, shoulders or neck

### ***PHYSIOTHERAPY MANAGEMENT :***

- Walking, hiking or jogging.
- Racket sports such as badminton, table tennis, squash.

- Yoga or Tai Chi.
- Outdoor cycling.
- Dancing.
- Aerobic classes.
- Marching with swinging arms.
- Swimming in different strokes.



**Study selection:**

- Randomised controlled trials involving people with Parkinson's disease, and in which exercise interventions were compared to non-exercise control interventions or another form of exercise.
- Outcome measures were:
- gait speed(comfortable and fast),
- stride/step length,
- cadence,
- double-leg support time (percentage of the gait cycle duration),
- Timed Up and Go test,
- 6-minute walk test,
- Freezing of Gait questionnaire and

### ***Dynamic Gait Index.***

#### ***Data extraction:***



- ✓ Two reviewers extracted data. Methodological quality was assessed using the PEDroScale, with differences in ratings resolved through discussion.

#### **Data synthesis:**

- ✓ Of 669 trials initially identified, 40 were included in the meta-analysis, with a total of 1656 participants ranging in Hoehn and Yahr stages I to IV.
- ✓ PEDro scores ranged from 3 to 8 points, indicating low to high methodological quality.
- ✓ The studies evaluated a vast array of exercise interventions, including balance training, physiotherapy, resistance training, treadmill and overground gait training, Tai Chi, yoga, boxing, , and aquatic therapy.

#### **➤ CYCLING:**



**Goals:**

- ✓ To promote wellness in the Parkinson population. Wellness is an active process of becoming aware of choices and making decision toward a more balanced and fulfilling life. Those who believe they can control their own symptoms tend to be more physically active.

**SHAKING :****➤ CONCLUSION:**

- Exercise interventions can improve gait speed, stride/step length, and Timed Up and Go test in ***people with Parkinson's disease, but at the time of this literature search there was little evidence that one form of exercise training was superior to another.***

**➤ TREATMENT:**

- ***Medication***
- ***Physiotherapy***
- ***Surgery ( for some people )***



## OSTEOARTHRITIS OF HAND

**Osteoarthritis (OA)** is a type of joint disease that results from breakdown of joint cartilage and underlying bone. The most common symptoms are joint pain and stiffness



### **Other names:**

- ✓ *Degenerative arthritis,*
- ✓ *degenerative joint disease*
- ✓ **osteoarthrosis**

### **Symptoms:**

- ✓ Joint pain,
- ✓ Stiffness
- ✓ joint swelling
- ✓ decreased range of motion

### **RISK FACTOR :**

- *Overweight,*
- *legs of different lengths,*
- *job with high levels of joint stress*

### **Causes:**

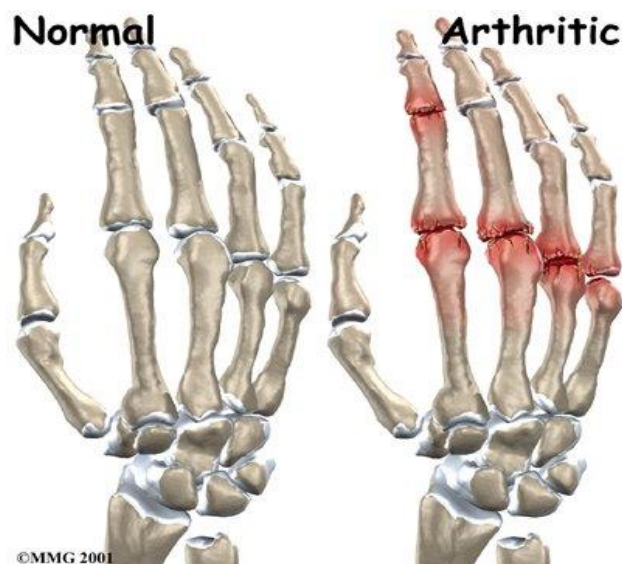
- ✓ *Connective tissue disease,*
- ✓ *previous joint injury,*
- ✓ *abnormal joint or limb development,*

- ✓ *inherited factors*



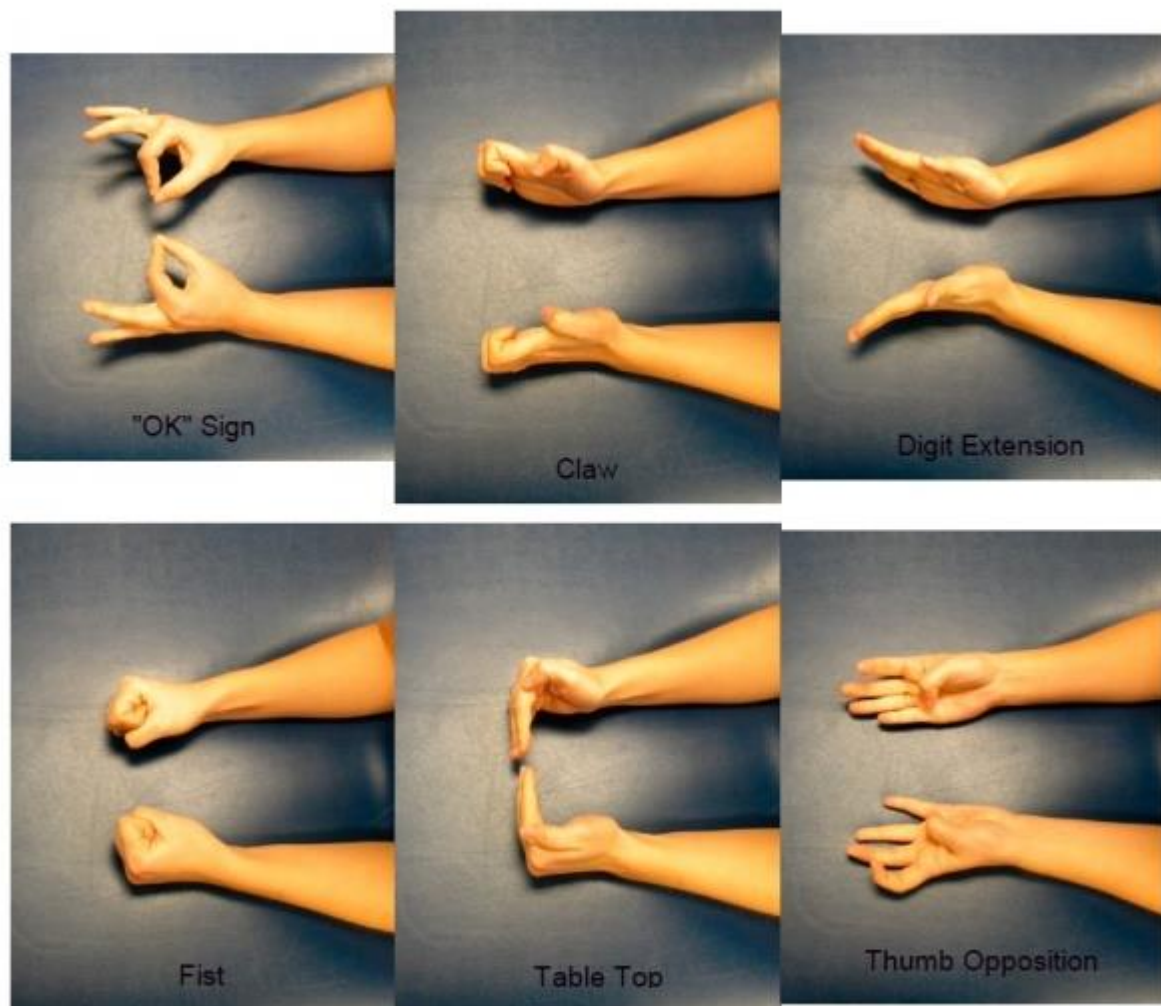
### **ARTHRITIS:**

Hand [osteoarthritis](#) (OA) is a common chronic condition involving one or more joints of the thumb and fingers. It is associated with pain, reduced grip strength, loss of *range of motion (ROM)*, and *joint stiffness leading to impaired hand function and difficulty with daily activities*.



### **Hand Exercises:**

- ✓ ***Hand Exercises are used as an intervention that aims to improve the mobility and strength of the hand and therefore,improving functional ability***



### Digit ROM Exercises

- Mobilizing exercise (Increase or maintain range of motion)
- Strengthening exercise ( that use resistance from putty, a gel ball, or elastic band to strengthen hand and wrist muscles)

### **Exercise for hand osteoarthritis:**

- **Exercise is an activity done to improve or maintain your fitness, ability or performance. A period of planned exercise often aims to improve or maintain muscle strength, physical fitness, joint mobility and overall health.**



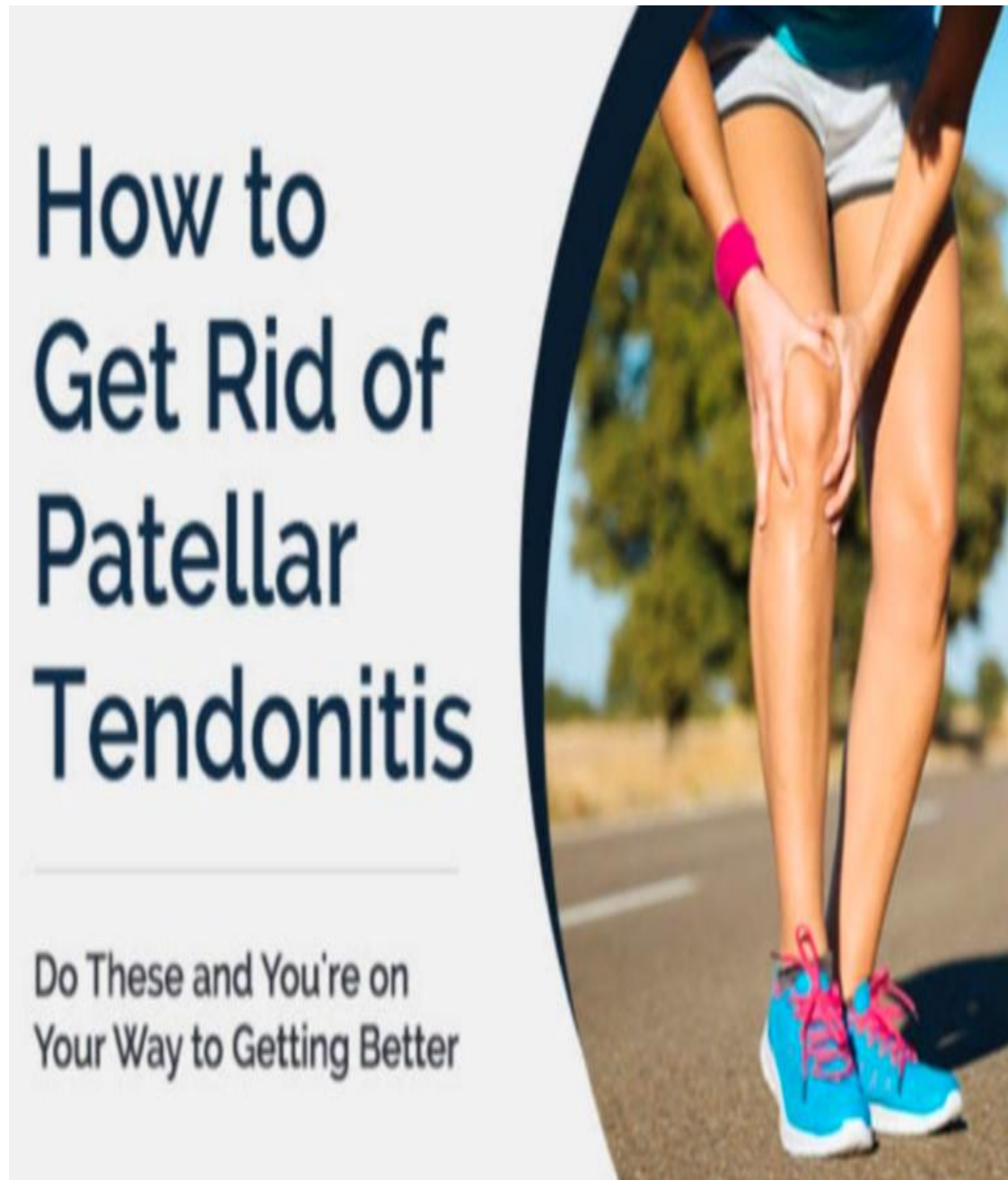
**TREATMENT:**

- ✓ Non-Drug Treatments
- ✓ Drug Treatments
- ✓ Surgical Treatments

# PHYSIOTHERAPY MANAGEMENT OF JUMPER'S KNEE (PATELLAR TENDINOPATHY)

E.pavithra

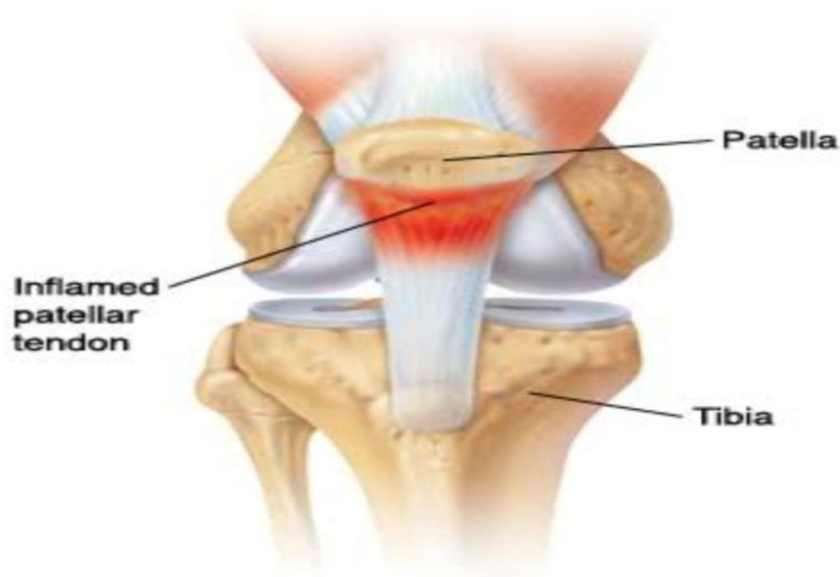
Bpt 3 yea rD section



## **Patellar tendinopathy:**

It is a common source for anterior knee pain which is characterised by pain localised to inferior pole of patella when under load. Until fairly recently the condition was known as patella tendonitis.





### Causes:

There are number of risk factors for developing patellar tendinopathy but an exact and specific cause is unknown.

On histological studies: Features of the condition is degenerative changes of the tendon rather than the presence of inflammatory cells.

### Knee examination

Dose-dependent pain, see previous section. Deficits in energy-storage activities can be assessed clinically by observing jumping and hopping. Stiff-knee vertical jump-landing strategy may be used by individuals with a past history of patellar tendinopathy<sup>[13]</sup>.

Examination of the complete lower extremity is necessary to identify relevant deficits at the hip, knee, and ankle/foot regions. Atrophy, reduced strength, malaligned foot posture, quadriceps and hamstring inflexibility, reduced ankle dorsiflexion have been associated with patellar tendinopathy and should also be





# Outcome Measures

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- Pain provocation ([Visual Analogue Scale](#) or Victorian Institute of Sport Assessment-patella<sup>[15]</sup>)
- Tendon swelling
- Return to activity

## Physiotherapy for patellar tendinopathy.

1. Eccentric Exercise therapy(EET).
2. Progressive Tendon loading exercise(PTLE).

### **Eccentric Exercise therapy (EET).**

Exercise is an important component of management of patellar tendinopathy. A variety of loading programs have been suggested for treatment of patellar tendinopathy.

1. Eccentric loading
2. Eccentric -concentric loading.

Most widely accepted treatment for patellar tendinopathy is eccentric exercise therapy after short period of rest.

Eccentric loading has been the most dominant approach for rehabilitation .Beneficial in reducing pain and returning function.

Eccentric-concentric exercise can begin with body weight squats but a significant load is important.

Gym machines such as leg press or knee extension provides control to amount of loading.If suitable for the patient a barbell squat or lunge can be an excellent progression.

Eccentric single leg decline squating.

Heavy slow resistance (HSR)-bilateral squats,hack squats,leg press.

Four stage progression:

1. Isometric
2. Isotonic
3. Energy storage
4. Progressive return to sport.

## Jumper's Knee (Patellar Tendon Injury) Rehabilitation Exercises



Standing hamstring stretch



Quadriceps stretch



Rectus femoris stretch



Straight leg raise



Prone hip extension



Side-lying leg lift



Clam exercise



Step-up



Wall squat with a ball

image 5

**Progressive tendon loading exercise (PTLE).**

For some patients PTLE may be more suitable option than EET .particularly if they are not adherent to eccentric exercise or if they find it too irritable and therefore unable to adhere to the programme.

**"Movement is a medicine for creating change in a person's Physical,emotional and mental states."**

# PHYSIOTHERAPY AND PILATES TO IMPROVE PULMONARY FUNCTION

V.R.RADHIKA

3<sup>rd</sup> year d section

## CONTENT:

- INTRODUCTION
- BIOMECHANICS OF BREATHING
- BREATHING DURING PILATES
- WHO CAN BENEFIT
- PHYSIOTHERAPY RELEVANCE

## INTRODUCTION :

The pilates method is commonly used by physiotherapist for various reasons such as ;injury recover, fall prevention, muscle imbalance, posture correction and much more. One benefit of pilates that's often overlooked is the improvement in pulmonary function.

While pilates is predominantly used for strengthening and flexibility, lung volumes, inspiration and expiration flow of rates.

## POSITIVE EFFECTS :

- Reduce stress
- Lowered blood pressure
- Improved focus
- Lowering the risk of cardiovascular diseases.



## **BIOMECHANICS OF BREATHING :**

- When we inhale, or breathe in, the air goes into the windpipe through our nose
- Fresh air with oxygen reaches the lungs from the windpipe
- The oxygen mixes with the blood and reaches the heart
- The heart pumps it and it reaches the other parts of the body

## **BREATHING DURING PILATES :**

Pilates focussed on 3 key method during exercise

- Lateral breathing
- Set breathing pattern
- Active breathing

**LATERAL BREATHING :** Lateral breathing refers to the lateral expansion of the ribcage while maintaining abdominal contraction during breathing.

**SET BREATHING :** Set breathing pattern are coordinated with each exercise or movement. Inhalation occurs during one phase of a specific movement/exercise, and exhalation during another phase of the movement.

## **WHO CAN BENEFIT :**

- ❖ Obese individuals – effectively improve
- ❖ Cystic fibrosis – improve respiratory muscle
- ❖ Chronic stroke – effectively improve cardio pulmonary function
- ❖ Non communicable diseases
- ❖ Ankylosing spondylosis
- ❖ Renal transplantation

## **PHYSIOTHERAPY RELEVANCE :**

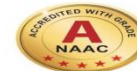
1. **Strengthens respiratory muscles-** literature indicates that pilates can significantly improve maximal inspiration maximum expiratory pressure
2. **Improve pulmonary parameters-** improved ventilation and per fusion are due to the respiratory rehabilitative method associated with pilates when coordinated breathing is utilize
3. **Improve cardio respiratory parameters** – the fact that pilates improves vo2 max means that it leads to cardiovascular changes, enhanced circulation, and vascularity to the muscles
4. **Improve trunk and mobility** – one of the fundamental principles in pilates is the centre and because all these segments are connected a stronger core/trunk will lead to improved diaphragm function and respiratory efficiency.



## **FACULTY OF PHYSIOTHERAPY**

### **NATIONAL SERVICE SCHEME CONSOLIDATED EVENTS (2020)**

<b>S.NO</b>	<b>EVENT TYPE</b>	<b>TITLE OF THE EVENT</b>	<b>DATE (DD/MM/YYYY)</b>	<b>VENUE</b>	<b>NO. OF PARTICIPANT</b>	<b>CHIEF GUEST / SPEAKER</b>
1.	AWARENESS PROGRAM	PULSE POLIO IMMUNIZATION CAMP	21-01-20	PRIMARY HEALTH CENTRE, MADURAVOYIL DIVISION, 20 BOOTHS.	98	-
2.	WEBINAR	BUILDING A FAIRER, HEALTHIER WORLD' TO COMMEMORATE WORLD HEALTH DAY	07-04-20	ONLINE MODE, GOOGLE MEET	250	DR. SRI SAKTHI D., ASSOCIATE PROFESSOR, DEPARTMEN
3.	SURVEY	SPITTING SKILLS CAMPAIGN TO PREVENT COVID-19	27-04-20	ONLINE MODE, GOOGLE FORMS	250	-
4.	SURVEY	CORONA AWARENESS	28-04-20	ONLINE MODE, GOOGLE FORMS	75	-
5.	WEBINAR	RULES AND INTERPRETATIONS OF TRACK EVENTS	11-05-20	ONLINE MODE, ZOOM MEETING	150	DR. S. SARABOJI, PRINCIPAL ADITYA COLLEGE OF PHYSICAL EDUCATION ANDHRAPRADESH
6.	AWARENESS PROGRAM	COVID AWARENESS	13-05-20	ONLINE MODE, YOUTUBE	20	-
7.	AWARENESS PROGRAM	COVID – 19 HAND WASH	13-05-20	ONLINE MODE, YOUTUBE	20	-
8.	TRANING PROGRAM	HOW TO MAKE A MASK	13-05-20	ONLINE MODE, YOUTUBE	6	-
9.	AWARENESS PROGRAM	HAND WASH AWARENESS	13-05-20	ONLINE MODE, POSTER PRESENTATION	35	-
10.	COMPETITION	CORONA AWARENESS QUIZ	18-05-20	ONLINE MODE, GOOGLE FORMS	300	-
11.	AWARENESS PROGRAM	CHILD ABUSE	19-05-20	ONLINE MODE, GOOGLE MEET	250	-
12.	WEBINAR	GENDER, RIGHT, EQUALITY & PEACE	19-05-20	ONLINE MODE, GOOGLE MEET	150	-



### FACULTY OF PHYSIOTHERAPY

13.	COMPETITION	SPORTS QUIZ	22-05-20	ONLINE MODE, GOOGLE FORMS	500	-
14.	SURVEY	MOTHER EARTH HEALING COVID - 19	22-05-20	ONLINE MODE, GOOGLE FORMS	400	-
15.	WEBINAR	CURRENT TRENDS IN VACCINE AND VACCINOLOGY	23-05-20	ONLINE MODE, GOOGLE MEET	280	DR.K.S.JAGANATHAN, DEPUTY DIRECTOR, SERUM INSTITUTE OF INDIA PVT LTD
16.	COMPETITION	COVID-19 GENERAL AWARENESS QUIZ	27-05-20	ONLINE MODE, GOOGLE FORMS	350	-
17.	WEBINAR	PAST TO PRESENT COVID-19 CHANGES	30-05-20	ONLINE MODE, GOOGLE MEET	250	PROF. GAUTHAM I MENON PROFESSOR OF PHYSICS AND BIOLOGY INDIA
18.	WEBINAR	NUTRITION FOR LIFE	04-06-20	ONLINE MODE, GOOGLE MEET	300	DR. ANNADURAI, NSS PROGRAMME COORDINATOR, BHARATHIAR UNIVERSITY COIMBATORE
19.	COMPETITION	ENVIRONMENTAL SCIENCE QUIZ	05-06-20	ONLINE MODE, GOOGLE FORMS	350	-
20.	COMPETITION	PLASTIC QUIZ	05-06-20	ONLINE MODE, GOOGLE FORMS	300	-
21.	COMPETITION	BLOOD DONOR DAY QUIZ	14-06-20	ONLINE MODE, GOOGLE FORMS	300	-
22.	SURVEY	WORLD BLOOD DONOR DAY 2020	14-06-20	ONLINE MODE, GOOGLE FORMS	50	-
23.	SURVEY	YOGA DAY	20-06-20	ONLINE MODE, GOOGLE FORMS	50	-