

# TECHNOLOGIES IN HANDBALL

SUBMITTED BY  
M.VIGNESHWARI  
MPED1  
ROLL NO:116

- For the fan at home too, new technology offers the opportunity to perhaps see the game from new angles or to engage with the action and other like-minded fans via their second screens – new innovations that could well attract a whole new generation of sports fans to the sport
- As part of its on-going work to further develop sport, the EHF has been working with experts from the sports tech industry to test a range of new technologies that could revolutionise the game in the future.

## NEW TECHNOLOGY BRINGING INNOVATION TO HANDBALL

- Data and technology are increasingly driving the development of major sports, not just in terms of performance on the court but also in the arena and on television as sports look to grow audiences and fan loyalty by offering that something extra.
- Information on the speed of the ball, passing tempo, how high a player can jump or how quickly players can accelerate past their opponents are crucial to the modern coach, but this is data that has not been readily available in the sport to date.



## Deconstructing the sport

- Taking advantage of the season hiatus in January due to EHF EURO, the federation invited two technology companies to Vienna to show off their offerings.
- Test subjects for these initial real-world trials were the players of the Vienna-based [HC Fivers WAT Margareten](#), a club with previous experience in the VELUX EHF Champions League and currently top of the Handball League of Austria.

- The company's CEO, Maximilian Schmidt, explained the benefits the technology can bring: "When we watch handball nowadays, we see a fascinating and fast sport but nobody knows how fast they are, how much distance they cover during a match, how is their acceleration or how fast the ball is. All this information brings a new dimension that allows fans see the sport through different eyes."

- In the first of the tests, carried out by EHF Marketing GmbH, the federation's marketing arm, each player and the ball itself was fitted with a chip to enable them to be tracked using technology from the company, [Kinexon Sports & Media](#).
- Player were tracked during a practice match using six receivers, which fed back information to a base station enabling coaches – and also potentially TV viewers at home – access to live statistics via their laptop or tablet.



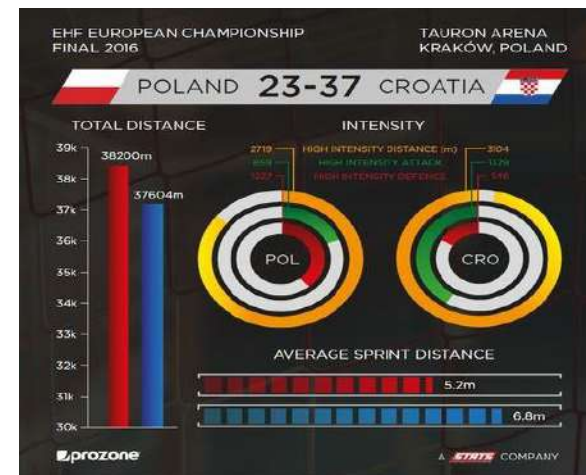
## Unique perspective

- In a further test with the Spanish company, [First Vision](#), the Fivers players were fitted with a wearable camera in their playing shirts to provide a unique 'point of view' perspective from the game in real time for broadcasters.
- Following the use of the 'spider cam', 'overhead cam' and 'in-goal cam' in the EHF's coverage of the sport, it may not be too long before the 'player-cam', 'ref-cam' or 'coach-cam' becomes an essential part of match coverage.

## Live tests in Poland

- The European Championship in January was also a testing ground for the latest in player tracking technology, with tools trailed that are already in use in competitions including the NBA and football's English Premier League from the company, [Prozone](#).
- The company was in Krakow for the competition's main round to follow a number of games with their unique camera system, which uses a technology similar to facial recognition to track players throughout the game.

- Using their system it is possible to follow the movement of both players and the ball and to analyse the distance players have run, how far they have jogged or sprinted during the match.
- The company's General Manager, Martin Bland explained: "We believe that Prozone offers a unique and game-changing product - a player tracking system, which can change the game's understanding of player performance in both a technical and physical aspect.
- "The data we can provide will accelerate player development, reduce injury, modernise talent ID and recruitment, and of course amaze spectators with unique data about their favourite teams and players."



- The first batch of tech trials has met with positive approval from coaches and players alike.
- After the experiments in Vienna, captain of the Fivers team, Markus Kolar, commented: “It was a great feeling for the team, everybody wanted to run the furthest and now we’re all looking to see who won.”
- And head coach, Peter Eckl, said: “This is very interesting tool, which will make the game easier to understand for coaches and players as well as spectators.

- “As a coach this system offers me the opportunity to measure the various performance parameters live and in real time. This is certainly the biggest strength of the system and in the future would allow training sessions to be adapted as they happen and be individually tailored, particularly as the technical requirements don’t disturb the players.
- “This tool is best suited to the tactical side of the game, allowing us to work more accurately, for example optimising the positioning of individual players in defence.”

- The trials will be now be evaluated by the EHF and will continue to look at a range of new technology solutions for implementation in its top competitions in the future.

## Handball Court Flooring

- Enlio flooring is the No. One preferred indoor PVC Sports Flooring and outdoor PP [Court Tiles](#) solution for over 10 years. Our Product range covers: PP Court Tiles , Sports Flooring , [Badminton Court](#) Mat, Table Tennis Sports Flooring , [Basketball Sports Flooring](#), Volleyball Sports Flooring , Tennis Sports Flooring , Indoor [Futsal Flooring](#), [Gym Room](#) Flooring, Kids Room Flooring , [Dance Flooring](#), Handball Flooring , Multi- Purpose Flooring . Court Tiles ( PP Interlocking Flooring ) Outside [Basketball Court](#), Outside Tennis Court , Outside Multi-Use , Wet Area Mats , [Futsal Court](#), Pvc Sports Flooring .



## Raindrop Surface

- IHF approved.
- High Strength wear resistance treatment
- Pure PVC reinforced layer
- High Density PVC foam and buffer layer.
- Length 15m, width 1.8m, thickness 7.0mm
- Warranty: 12 years.
- Application: World Events or All High Level Sports Stadiums, especially for Indoor Basketball, Handball and Volleyball Courts ect.

## Advantage

- 1) Environment friendly: made of PVC pure virgin material
- 2) High quality and longest service life: one-off scrape coating techniques.
- 3) High density of the foam layer, no calcium addition. Control well of the quality.
- 4) Wear resistance, moisture proof, slide prevention, shock absorption, fashion and beautiful, etc.
- 5) Easy installation and maintenance.
- 6) Different surface design to meet specific sports performance.

## Factory& warehouse



Established in 2007,with bottom-up market, we aim at providing ultimate sports floor solutions, which are innovative, delicately manufactured floors and integrated with Erilio's sales associates plus professional installation services. Based on its contemporary company culture and persistent innovations, Erilio has established successful long-term relationships with several international sports government bodies, such as IWF, ITF, IHF and been approved to be the official equipment supplier since then. Emphasizing on quality control, the Company has meet and even exceeded all the standards required by ISO9001, ISO14001, CE and SGS international quality management authorities. In addition, Erilio consecutively managed to be the Exclusive Event Supplier of 2014-2016 season CBA (Chinese Basketball Association) League Matches, 2014, 2019-2020 ITF Championships, 2019 Youth Olympic Table Tennis, 2013-2020 ITF World Cup, 2013-2019 IWF Championships, 2014-2017 ITF China Open, 2014-2017 ITF China Master, 2016-2018 FIBA 3X3 World Tour Qualifier of China, and various domestic, international sports events.







THANK YOU

**Sports Technology**



**SUMMITTED BY,  
M BHAVITHRA  
M.P.Ed**

## ATTACK II VOLLEYBALL MACHINE (SERVING)

- **ATTACK VOLLEYBALL MACHINE, A PROFESSIONAL TRAINING TOOL (WOMENS PROGRAMS) FOR SERVE RECEIVE, DEFENSIVE, BLOCKING AND ATTACKING DRILLS**
- **THE ATTACK VOLLEYBALL MACHINE WILL DELIVER THOUSANDS OF REPS IN DAILY PRACTICE OF JUMP SERVE RECEIVING, DIGGING AND SPIKING.**
- **THE MACHINE PROVIDES A FULL RANGE OF SPINS, THROWING BOTH SHARP TOPSPINS AND BREAKING FLOATERS TO SIMULATE MATCH SITUATIONS.**
- **IT CAN ALSO BE EASILY ROLLED ALONG THE SERVING BASELINE, CHANGING THE ANGLE OF SERVES.**

## ATTACK II MACHINE FEATURES



## EXERCISE EQUIPMENT - VOLLEYBALL PAL

- THE VOLLEYBALL PAL AIMS TO IMPROVE HUMANS MUSCLE TONE AND MENTAL ABILITIES OF A PLAYER.
- THE VOLLEYBALL PAL CONSIST OF A VELCRO STRAP THAT SECURES AROUND THE WAIST A NEOPRENE POUCH THAT HOLDS THE VOLLEYBALL, AND AN ELASTIC CORD CONNECTING THE WAIST STRAP TO THE BALL POUCH.

### ADVANTAGE

- THIS TECHNOLOGY IS USED THROUGHOUT PREPARATION AND PERFORMANCE TRAINING, BECAUSE THE SMOOTH ACTION OF THE ELASTIC CORD GUIDES THE BALL BACK TO THE PLAYER EVERY TIME.

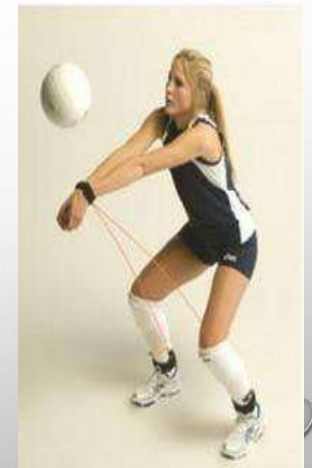


## PASS RITE

- THE PASS RITE CONSIST OF TWO STRINGS WHICH ARE CONNECTED AROUND THE KNEES AND WRITS, FORCING THE PLAYER INTO A PROPER PASS POSITION.

### ADVANTAGE

- THE PASS RITE AIMS TO IMPROVE THE PASSING ABILITIES OF A PLAYER.
- THAT THEY ARE ABLE TO BETTER PLAY AND LOWER THE CHANCES FOR A TEAM TO LOSE POINT DUE TO A BAD PASS.



### HITTING MACHINE

- HITTING MACHINE IS EXERCISED IN VOLLEYBALL SPIKE TRAINING FOR THE [VOLLEYBALL](#) PLAYERS WHICH ALLOWS THE RELEASE OF THE BALL AS WELL AS THE SELF-RELOADING OF THE NEXT BALL.
- THE KEY TO SUCCESS FOR PLAYERS IN A [VOLLEYBALL GAME](#) IS TO ACHIEVE MAXIMUM VERTICAL JUMP WHILE MAINTAINING THE TRAJECTORY OF THE BALL DOWNWARD AT THE SAME TIME.

### ADVANTAGE

- THIS EQUIPMENT ALLOWS PLAYERS TO DEVELOP THEIR SKILLS QUICKLY AND EASILY EVEN WITHOUT A COACH OR A TRAINER.
- THE HEIGHT OF ACUSPIKE HITTING MACHINE CAN EASILY BE ADJUSTED BETWEEN 6 FT. -11 FT. (FROM GROUND TO THE TOP OF THE BALL).



### SET IT RITE

- EACH STRAP IS ADJUSTABLE AND INCLUDES A PLASTIC KNOB THAT RESTS FIRMLY ON THE PALM TO REINFORCE PROPER HAND PLACEMENT ON THE BALL WHILE SETTING
- PERFECT FOR USE DURING SETTING DRILLS FOR PLAYERS OF ALL SKILL LEVELS



### SETTING PRACTICE NET

- A HEIGHT OF UP TO 11'6" AND A 45-DEGREE ADJUSTABLE BASKET, BOWNET'S VB SETTING NET IS ABLE TO CATCH EVERY SET AND SERVE FROM EVERY ANGLE.



THANK YOU



## SPORTS TECHNOLOGY

THE FUTURE  
TECHNOLOGY OF  
SPORT



Assignment submitted to

**Dr.K. Jothi Dayanandan**



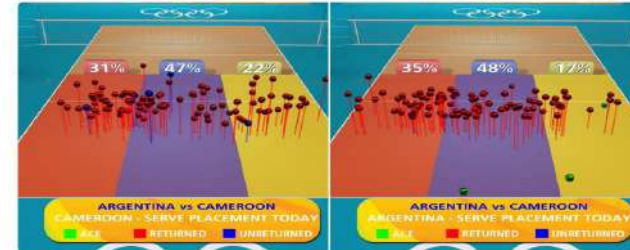
## TECHNOLOGICAL ADVANCEMENTS IN VOLLEYBALL

- Officiating
- Training
- Game standards
- Player Quality
- Spectator Transparency

## HAWK'S EYE



Here are the serve placements for the match of #ARG v #CMR #Rio2016 #volleyball



- Widely used
- Helps to determine the position of the ball.
- Used for both training and Officiating purpose.

## ELECTRONIC TABLETS



Electronic tablets are provided to officials for reviewing the rally.

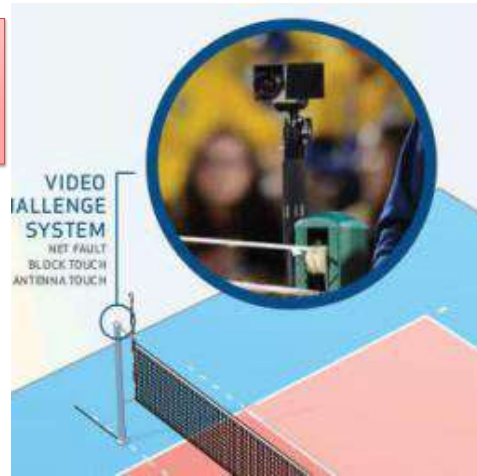
## VIDEO CHALLENGE SYSTEM



Video challenge system an additional unit of HAWK'S EYE

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High definition cameras are arranged above the net for finding out the fouls over and under the net.



## REFREE WEARING A MICROPHONE



Nowadays verbal communications are also given along with the whistle.

## ELECTRONIC SCORESHEET



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Manual score sheets are being used for flawless scoring

## MIZUNO VOLLEYBALL SHOES



- Energy Core is the softest and bounciest midsole foam **Mizuno** has ever created.
- **Mizuno** claims it is 293% softer and provides 56% more energy return than any previously **used** material.
- Energy Core will be **used** inside the midsole of the shoe.

## ASICS SHOES WITH GEL QUALITY



Asics is also another prominent shoes in volleyball which uses soft Elastomer gel to reduce the shock and increased stability.

## ADVANCE MACHINES IN VOLLEYBALL

SUBMITTED BY  
K.BHARATHI  
MPED1

**THANKYOU**

By *ANOOP J KALLOOR*  
*MPed. I*

## The ultimate volleyball training machine

- With AirCAT, gone are the days when you spent more time tossing balls than working closely with your players to improve their performance.
- The AirCAT is a fully-automatic, battery operated drill machine that uses patented **Consistent Air Technology** to safely and efficiently train all aspects of the game of volleyball: hitting, digging, setting, blocking, and serve receive.
- Endorsed by top programs all over the world, AirCAT allows coaches to spend less time hitting and tossing and more time teaching and training.



## Features & Benefits

- AirCAT ball feeder holds 10 balls at a time
- Wireless Remote Control (2)
- Cordless/Rechargeable battery offers 6-8 hours of training on 1 charge
- Consistent serve receive reps
- Adjustable angle for each skill and drill
- Lockable wheels for accuracy

## The most versatile training machine around

Use AirCAT for hitting, blocking, setting, digging, and serve receiving to train your players faster than ever.



## Japanese Robot Block Machine For Volleyball Training Can Mimic Human Blockers





- To perfect their attacks, some of Japan's top volleyball players are training against a robot that can mimic the tactics of opposing teams.
- The Japanese Volleyball Association's "block machine" consists of three pairs of robotic arms that move side to side in front of the net. These represent blockers – players who defend against "spikes" from the attacking team that send the ball forcefully over the net, making it hard for opposing players to return it.

- "A spike is the most effective way to win points in volleyball," says Laura Woodruff at Volleyball England. "The blocker's job is to try to make part of the court unavailable to the attacker, whilst the attacker has to try to find space to hit the ball into."
- If the attacker gets it right, the ball flies over the net and straight onto the ground to win a point. If a blocker intercepts it, they can smash it right back over.

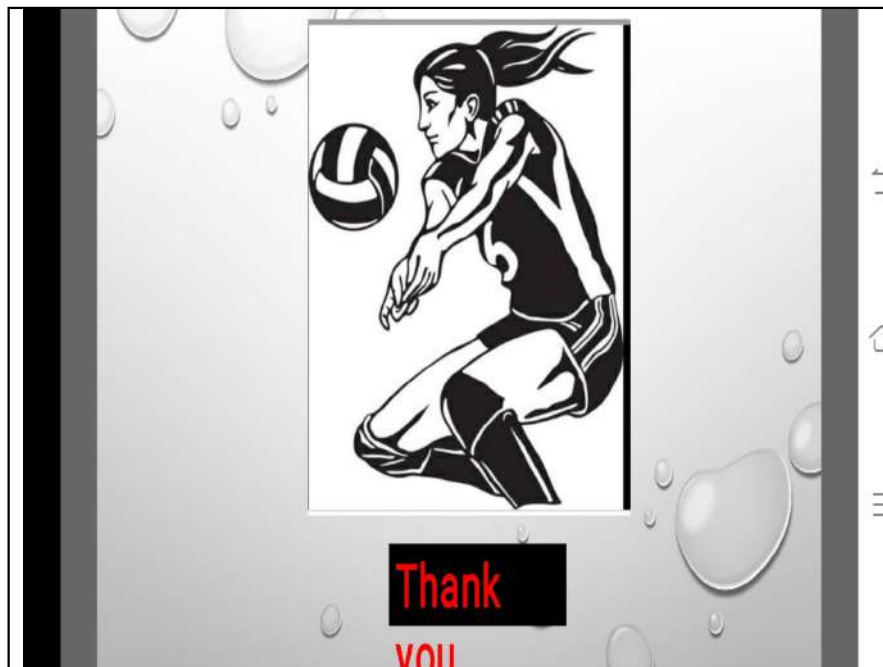
## **Robot re-enactment**

Developed by researchers at the Japanese Volleyball Association and the University of Tsukuba, the block machine lets a coach program the robot arms for different training drills. If they think their team could have handled a situation in a previous game better, they can recreate the moment by positioning the arms to stand in for opposition team members. They can also mimic the tactical styles of future opponents.

- To start the action, the coach presses a button and the robot arms whizz independently into place. The machine can travel 3.7 metres per second, which is faster than a player can move from one position on the court to another.
- Six players from Japan's women's volleyball team used the robot in training sessions over eight days. Some players said they felt little difference between playing against the machine and attacking in a real game.

But because the machine's configuration is set before the attack, the robot blockers can end up in the wrong position if the practice drill is slightly displaced on the court. The researchers plan to remedy this by adding motion sensors to the machine that could automatically adjust its position. They will present their work at the [IEEE International Conference on Robotics and Automation](#) in Singapore that starts in May.

"It is a very sophisticated device with positive feedback overall from players," says [Luca Paolo Ardigò](#) at the University of Verona, Italy. It would be good to find out the impact the system could have on players' performance over the course of a season, he says.



# ASSIGNMENT--

I

BY  
J.LINCY

## SPORTS TECHNOLOGY

BY  
J.LINCY

### FALSE START DETECTION SYSTEM

- Start monitoring systems are used for ATHLETICS Event



### Starting Blocks

- Starting blocks were developed in the late 1920's over the alternative of digging holes into ground.
- They were patented in 1935, and have officially been used at the start of sprint races since 1937.
- Several iterations of starting blocks have been filed by US

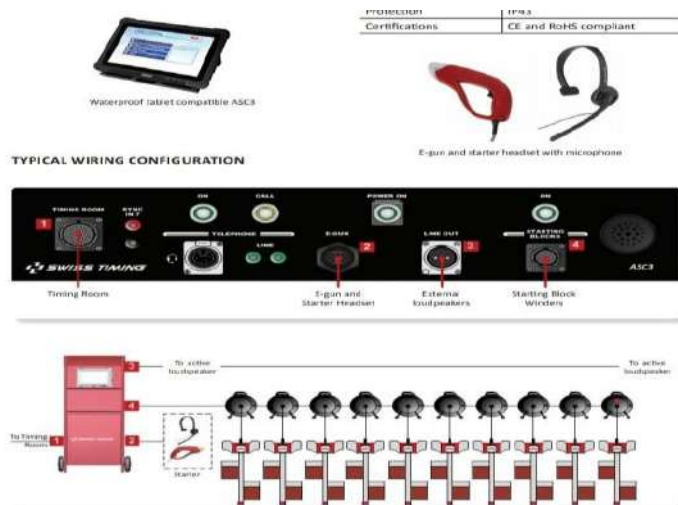


Valeri Borzov, circa 1972

## ASC39 (AUTOMATIC START CONTROL)

- ❖ Is suitable for all levels of athletics , and is compatible with timing installation manufactured by swiss timing.
- ❖ It enables up to 10 lanes to be monitored simultaneously.
- ❖ The starting block sensor take in account the physiological response time.
- ❖ The time elapsed between the starting signal and the thrust of the athlete's foot against the starting block.
- ❖ The system memorizes and prints the reaction times occurring in the interval of 0.3 second before and 0.7 second after the starting gunshot.
- ❖ Each athlete's force curve is displayed on the computer screen and can be zoomed for deeper analysis.

## TYPICAL WIRING CONFIGURATION



## FALSE STARTING

- In the event of a false start , an acoustic signal is transmitted by the central station to the starter's headphones and to the starting block loudspeakers
- Online data transfer is made possible via RS422 serial line to a data handling unit and camera SCAN'O'VISION.
- The instructions given by the starter are amplified and easily understandable by the athletes in their individual loudspeakers.
- The volume of the voice calls and the volume of the false start warning sound can be adjusted individually.
- With its handle and wheels,ASC3 is easily movable between the different start positions.



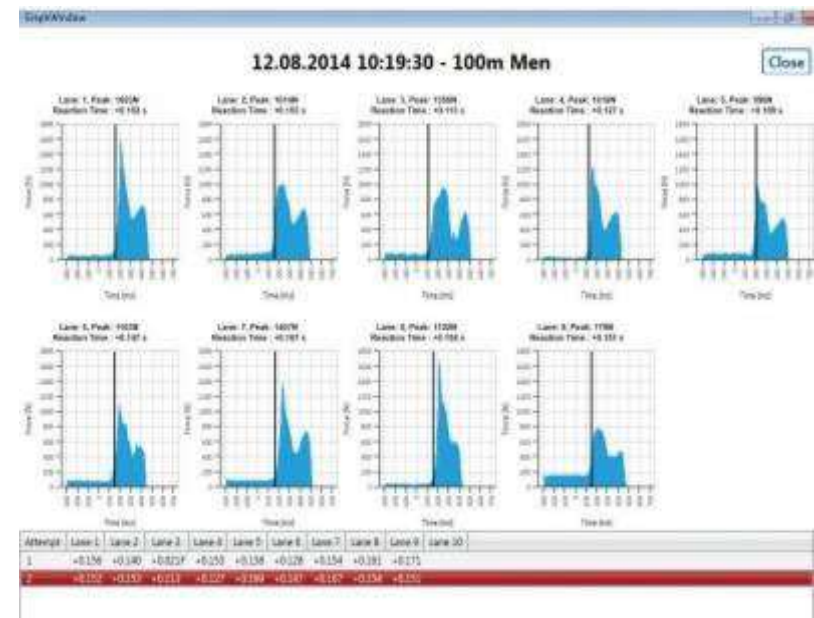
## TOP FEATURES

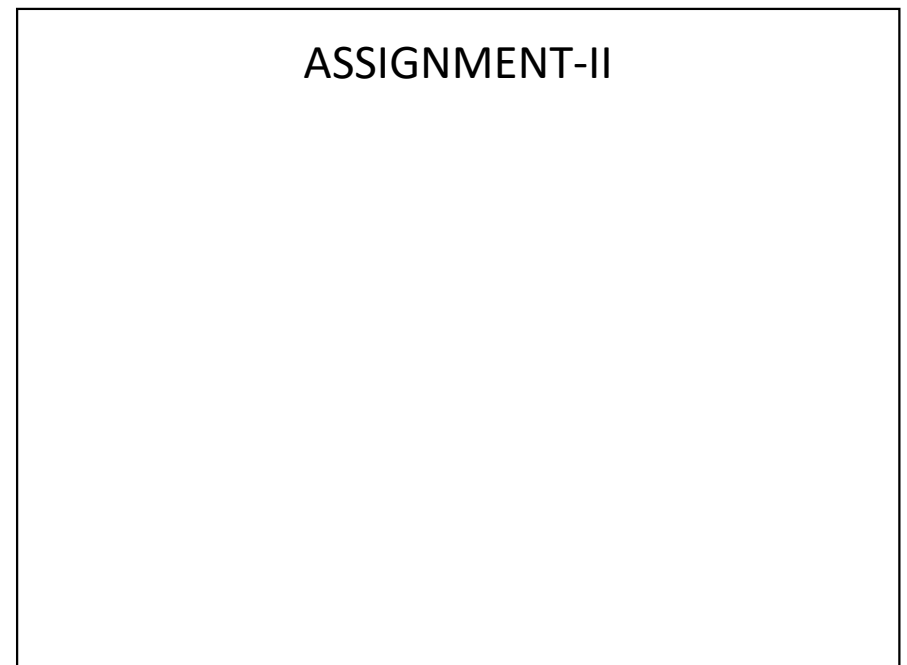
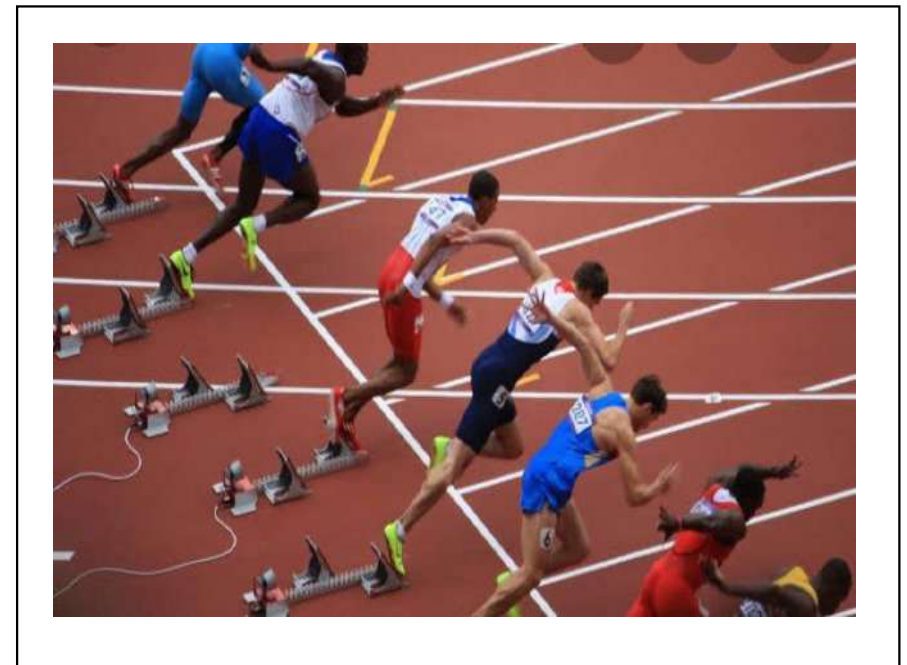
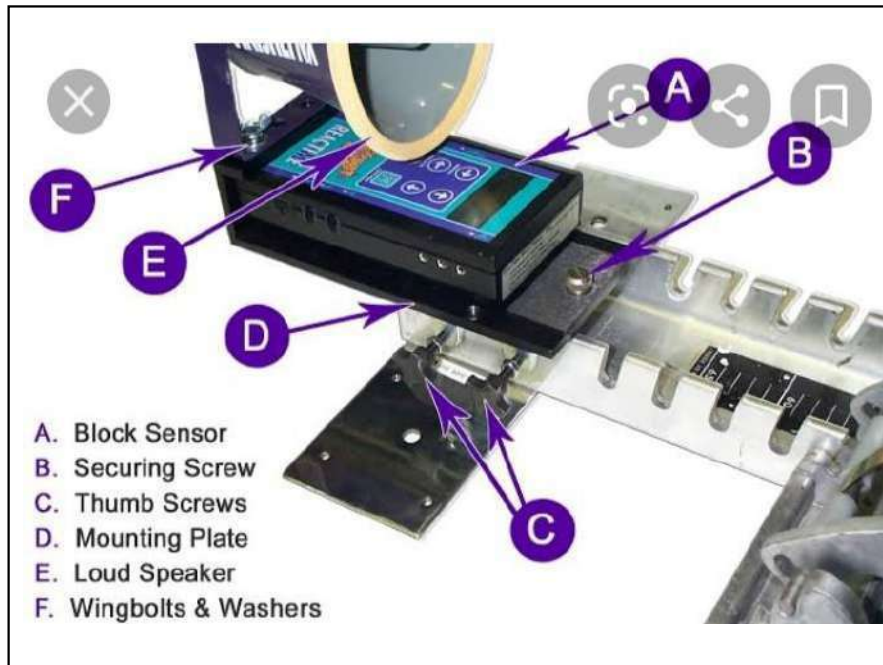
- Suitable for all competitions' level.
- Monitor up to 10 lanes simultaneous.
- Acoustic signal in case of false start.
- Force curve display for each lane.
- Electronic starting system-E-gun-included



## RACK TIMER **ASC3** QUANTUM FEATURES

- ✓ Thanks to the new sensor technology, the athlete's starts can be analysed, and thus also serve as an ideal training tool.
- ✓ The athlete force (N) is measured before and after the gun shot (at 0 sec) in order to detect a false start.
- ✓ The black line shows the reaction time of the athlete.
- ✓ At the first attempt, the athlete in lane 3 performed a false start.
- ✓ The illustrated graphs represent the second attempt.





## SPORTS TECHNOLOGY

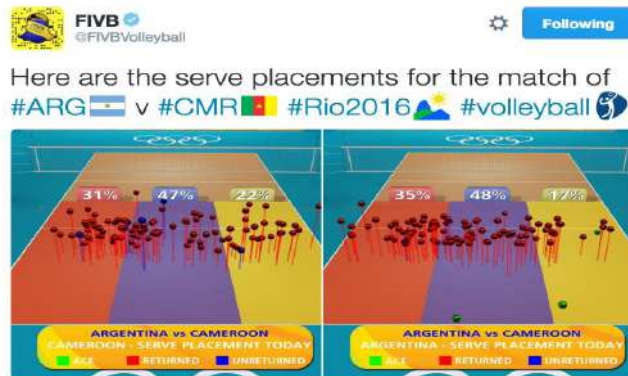


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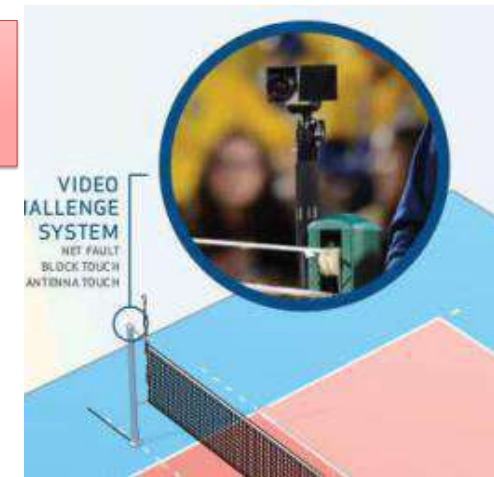
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THANKYOU

By ANOOP J KALLOOR  
MPed. I

ASSIGNMENT-III

# BASKETBALL SHOOTING MACHINES



SUBMITTED BY.  
S.PRIYADHARSHINI  
MPED1

- Basketball shooting machines can help you improve your shooting ability by increasing the number of shots you get up during the time you have to practice. These machines are placed under the hoop and as you shoot, they gather the ball and pass it back to you so you can keep shooting.
- In other words, a basketball shooting machine is basically a robot rebounder that can be set up to get you the ball quickly anywhere you want to practice your shots. This can help you become a better shooter and increase your on-court abilities.

## Quick summary

- [iC3 Shot Trainer](#) The design of this machine helps you to improve the arc of your shot and then returns the ball back to you so you can keep shooting at a high volume.
- The [SKLZ Kickout](#) is a basic shooting and rebounding machine that attaches to the hoop and allows the ball to kick back out to you once you've made a shot. This design is simple but still effective.
- A more pro-level shooting machine is the [MYOM Basketball Rebounder Machine](#). This machine is expensive but is capable of rebounding your shot and passing it back to you quickly and can be adjusted to pass to different areas of the court.

### 1. [iC3 Shot Trainer](#)



### ADVANTAGES

- Effective shooting machine that will help improve your shot.
- Easy to transport and pack to take with you to any court.
- High net design improves the arc of your shot.

### DISADVANTAGES

- Ball can sometimes get stuck in the machine.
- Attachments to hold the machine in place can loosen over time.

## 2. SKLZ Kickout



This is a simple but still effective machine that works well without any moving parts. The SKLZ Kick out attaches to the hoop or net you are shooting on and a plastic slide like design allows the ball to roll or bounce back your way. The simple design means there aren't any parts to break or maintenance that needs to be done on this machine. It also easy to transport and one of the cheapest basketball shooting machines around.

### ADVANTAGES

- Very affordable.
- Easy to set up and use quickly.
- No moving parts to break or wear out.

### DISADVANTAGES

- Not adjustable so ball only returns in one direction.
- It does not collect and return missed shots.

### 3. MYOM Basketball Rebounder Machine



The MYOM Basketball Rebounder Machine is a pro-level machine that can catch and return shots quickly and accurately. This machine is set up under your basketball hoop a large net will catch any made or missed shots, funnel the ball do the return mechanism, and deliver a pass back into your hands so you can get another shot up. It's a big machine but is a lot of fun to use and will definitely improve the quality of your shot





Gampala Abhinava Reddy (10A) M.P.Ed 2 Year

MEAN DEVIATION		
INTERMEDIATE SERIES	DISCRETE SERIES	CONTINUOUS SERIES
Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum  f(x - \bar{x}) $ Step 3: M.D = $\frac{\sum  f(x - \bar{x}) }{N}$	Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum f x - \bar{x} $ Step 3: M.D = $\frac{\sum f x - \bar{x} }{N}$	Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum f x - \bar{x} $ Step 3: M.D = $\frac{\sum f x - \bar{x} }{N}$
Coefficient of Mean Deviation = $\frac{\text{Mean Deviation}}{\text{Mean}}$		
STANDARD DEVIATION		
INTERMEDIATE SERIES	DISCRETE SERIES	CONTINUOUS SERIES
Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum f(x - \bar{x})^2$ Step 3: find $\sum f(x - \bar{x})^2$ Step 4: $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$	Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum f(x - \bar{x})^2$ Step 3: find $\sum f(x - \bar{x})^2$ Step 4: $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$	Step 1: find mean $\bar{x} = \frac{\sum fx}{N}$ Step 2: find $\sum f(x - \bar{x})^2$ Step 3: find $\sum f(x - \bar{x})^2$ Step 4: $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$
Coefficient of Standard deviation = $\frac{\text{Standard deviation}}{\text{Mean}}$		
Z Scale	Sigma Scale	Null Scale
$Z = \frac{x - \bar{x}}{\sigma}$ $\bar{x} = \frac{\sum fx}{N}$ $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$	$\sigma = 16.66 Z + 50$ $Z = \frac{\sigma - 50}{16.66}$	$\text{Null Scale} = 1000Z + 50$ $Z = \frac{\text{Null Scale} - 50}{1000}$

Gampala Abhinava Reddy (10A) M.P.Ed 2 Year

CORRELATION  
[-1 ≤ r ≤ 1]

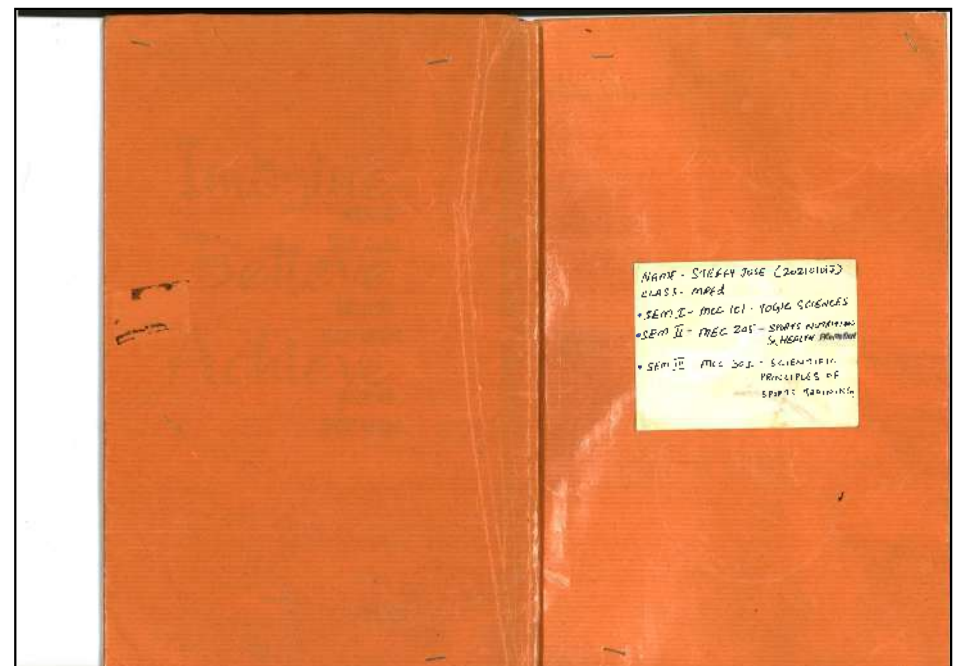
INTERPRETATION	
1. If r = 0	No correlation
2. If r = +1	perfect Positive correlation
3. If r = -1	perfect Negative correlation
4. If 0 < r < 0.5	low +ve correlation
5. If -0.5 < r < 0	low -ve correlation
6. If 0.5 < r < 1	high +ve correlation
7. If -1 < r < -0.5	high -ve correlation
8. If 0.5 < r < 0.75	Moderate +ve correlation
9. If -0.75 < r < -0.5	Moderate -ve correlation

PEARSON'S PRODUCT MOMENT CORRELATION COEFFICIENT	
$r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$	Step 1: find mean of variable (x) & variable (y) Step 2: find (x - $\bar{x}$ ) of two variables Step 3: find $\sum xy$ and $\sum x^2$ Step 4: substitute in the formula.

RANK CORRELATION	
RANK NOT REPEATED	RANKS REPEATED
$r = 1 - \frac{6 \sum D^2}{N^2 - 1}$ Step 1: find Rank by ranking Step 2: find $\sum D^2$ Step 3: find $r$ by formula Step 4: Substitute in the formula	$r = 1 - \frac{6 \sum D^2 + m^2 - m + n^2 - n}{N^2 - 1}$ Step 1: find Rank by ranking Step 2: find $\sum D^2$ Step 3: substitute in the formula

Gampala Abhinava Reddy (10A) M.P.Ed 3 Year

T-RATIO	
INDEPENDENT T TEST	DEPENDENT T TEST
$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}}$ $s_p^2 = \frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}$ $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}}$	$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_p^2}{n}}}$ $s_p^2 = \frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}$ $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_p^2}{n}}}$
Step 1: find mean Step 2: find Standard deviation Step 3: find $\bar{x}_1$ and $\bar{x}_2$ Step 4: find $s_p^2$ and $t$ Step 5: Apply in formula.	Step 1: find mean Step 2: find Standard deviation Step 3: find $\bar{x}_1$ , $\bar{x}_2$ and $x$ Step 4: find $s_p^2$ and $t$ Step 5: substitute in formula.
CHI SQUARE	
$\chi^2 = \frac{\sum (O - E)^2}{E}$	







# ADVANTAGE

- Improves brain function
- Lower stress levels
- Better gene expression
- Increases flexibility
- Lowers blood pressure
- Improves lung capacity
- Reduces anxiety
- Reduces chronic back pain
- Improves brain function
- Lower stress levels
- Lowers blood sugar in diabetics
- Improves sense of balance

# 4 STAGES OF YOGA

- The 1st stage -> ARAMBHAYASTHA is one in which we practice at one level of our physical body
- The 2nd stage -> GHATAVASTHA, when the mind begins to move in union with the body
- The 3rd stage -> PARICHAYASTHA, when the mind, intelligence and the body becomes one
- The 4th stage -> UCHHAYASTHA, the state of perfection.

ASTANGA YOGA

Is a style of yoga as exercise popularized by K. Pattabhi Jois during the 20th century, often remembered as a modern-day form of classical Indian yoga. The style is energetic, synchronizing breath with movements. The individual poses (asanas) are linked by flowing movements (vinyasa).

# Astanga (Eight Limbs of Yoga)

is Patanjali's classification of classical yoga, as set out in his Yoga Sutras.

- Yama (restraint)
- Niyama (observance)
- Asana (physical posture)
- Pranayama (regulation of breath)
- Pratyahara (sense withdrawal)
- Dharana (focus/concentration)
- Dhyana (meditation)
- Samadhi (total absorption)

-> YAMA (RESTRAINT)

- 5 types of Yamas ->
  1. Ahimsa (non-violence)
  2. Satya (truthfulness)
  3. Asteya (non-stealing)

1. Ahimsa - means non-harming or non violence

In Sanskrit: Ahimsa yoga is founded on the principle that yoga should be safe, accessible, inclusive and engaging for all students - regardless of physical condition, level of experience, or reasons for being interested in yoga. It is the practice of self-regulation, designed to free us from being victims of our own human impulses. This principle is the driving force behind the Yoga's daily decisions and behavior.

2. Satya

- Truthfulness or the action that conveys the reality as it is. Speech and mind conforming to reality as seen, inferred or heard. Speech should not be deceptive, logical, equivocal, barren of a meaning, or hurtful - avoid unpleasant truth or pleasant untruth. Give up luxury of imagination in favor of pure objectivity. Take ego with the love and of inhibition. Everyone has their own perception of truth - when established in truth, spirit of action depend upon the action of the yoga (Sutra 2.36).

3. Asteya

- means non-stealing. Taking something not belonging to oneself is stealing. To forsake any such desire is Asteya. Greed (lobha) and desire (raga) cause stealing. Developing non-attachment helps resist temptation for objects of the senses. Making demands in a relationship is stealing. Through practice of Asteya, all treasures will be at your disposal (Sutra 2.37).

4. Brahmacharya - or celibacy, is controlling the sense organs and refraining from the eight forms of sexual indulgence.

A Brahmachari should have frugal diet and moderate sleep. Avoid craving for sensual enjoyment. Sublimate and redirect sexual energy - to achieve inner strength. One established in celibacy attains "Vira" - indomitable courage, vigor (Sutra 2.38); and can effectively transmit true knowledge of self to disciples.

5. Aparigraha

- or non- hoarding, means no possessions, besides what is needed for basic sustenance. Time and energy spent in accumulation and guarding possessions. Constant fear of losing causing mental anguish and pain. Aparigraha removes fear, hate, disappointment, attachment, anxiety and pain - when established in aparigraha, one obtains full knowledge of past and future lives (Sutra 2.39).

-> NIYAMA (OBSERVANCE)

• 5 types of Niyamas -

- 1. Saucha (cleanliness)
- 2. Santosha (contentment)
- 3. Tapas (austerity)
- 4. Svadhyaya (self-reflection/self-study)
- 5. Ishvara Pranidhana (Surrender to God)

1. Saucha (cleanliness) - External cleanliness through soap/water, etc and taking pure foods (including fasting). Hatha Yoga has six cleansing techniques - neti, basti, dhauti, kapalbhati, bastika, nauli. Internal cleanliness through removing anger, pride, arrogance, jealousy, greed, delusion, etc (Sutra 2.33).

Self-discipline, etc to purify the mind. Cleanliness of environment (non-pollution); from Saucha comes delight for one's own body and distinction for contact with others (Sutra 2.40). From inner purity arises purity of Sattva, cheerfulness, one-phobicness, control of senses, and fitness for vision of the self (Sutra 2.41).

2. Santosha (Contentment) - Being contented with what we have, not desiring more than what we need. Being contented in all situations, under all circumstances (not constantly complaining). No need to strive to 'be something' or 'achieve something' - we are perfect the way we are. One established in Santosha attains supreme happiness (Sutra 2.42).

3. Tapas (Austerity) - Defined as scorching pain of experiences like heat/burn, pain/pleasure, hunger/thirst, etc. Ability to sit and stand motionless. Ability to hold stone. Practice of asana, pranayama helps develop tapas. Tapas is needed to remove impurities caused by karma, afflictions (klesha) and propensities (vasanas). When established in Tapas, mastery over body and senses is achieved (Sutra 2.43).

4. Svadhyaya (Self-Study) - is a Sanskrit term, which means, the recitation of the Vedas and other sacred texts. It is a broader concept with several meanings. Reading anything that helps deepens one's own yoga practice and moves one closer toward their self can be a daily practice of Svadhyaya. The aim of this practice is to bring the experience of that immense consciousness, the self, to awareness.

To practice Svadhyaya, one can meditate and study themselves, their activities and thoughts, practice yoga, study the wisdom teachings and spend solitary time in nature, thus widening our knowledge and understanding.

5. Ishvara Pranidhana (Surrender to God) - Ishvara is a Sanskrit word, that can be translated to mean, supreme, or personal, God. The practice of Ishvara Pranidhana therefore means, that if we are able to completely surrender our individual ego identities to God (our own higher self) we will attain the identity of God. It is a "big picture" yoga practice; it indicates a sacred shift of perspective that helps us to remember, step by step, and receive the grace of being alive. Ishvara Pranidhana can be practiced by spending time by oneself, talking or writing to oneself; being gentle with oneself and practicing gratitude directed.

-> ASANA (Physical posture)

An asana is a body posture, originally and still a general term for a sitting meditation pose and later extended to hatha yoga and modern yoga as exercise, to any type of position, adding reclining, standing, inverted, twisting and balancing poses. Asanas are performed to improve flexibility, strength and balance. It helps the body's joints, ligaments, and muscles strengthen through movement. A regular yoga practice can, over time, increase flexibility and mobility, lubricating the spine and alignment to act in everyday activity.

• Two kinds of Asanas

- 1. Dhyanasana (meditative)
- 2. Svanastikasana (classical/orthopedic asana)

• Three types of Asanas

- 1. For the sake of Niyama
- 2. For the sake of physical health (cultural and sportive)

3. For the sake of relaxation

• Some classify asanas under these ways

- 1. Standing poses - give stability
  - Parsvotkandhasana (Side angle pose)
  - Trikonasana (Triangle pose)
  - Utkatasana (Chair pose)
  - Ardha Chandrasana (Half Moon Pose)

• Viparita Vahabandhasana (Revered Warbler pose)

2. Seating poses - are relaxing

- Padmasana (Lotus Pose)
- Yoga Mudrasana
- Ardha Matsyendrasana (Spinal Twist)
- Vajrasana (Diamond Pose)
- Kalasana (Cup Pose)
- Kukkurasana (owl Pose)
- Kumarasana (Tortoise Pose)
- Akarna Chandrasana (Sleeping Bow)
- Parivrttamanasana (Revered Bow)
- Purvottanasana (Inverted Plow)
- Tarsa Sthirasana (Head to knee Pose)
- Eka Pada Sthirasana (1 leg one shoulder Pose)

3. Twist positions - are cleansing

- Namaskar Parsvotkandhasana (Prayer Twist)
- Parivrtta Ardha Matsya Sthanasana (Revered downward facing dog)
- Belly Twists
  - Jathara Parivartanasana
  - Parivrtta Trikonasana (Revered Triangle)
  - Parivrtta Ardha Chandrasana (Revered Half Moon)
  - Parivrtta Ardha Chandrasana (Revered Half Moon)
  - Ardha Matsyendrasana (Half bird of the Paradise pose)
  - Parivrtta Parsvotkandhasana (Revered Spinal Twist)



④ Prone Poses - are energizing and useful (Lying on abdomen)

- Bhujangasana (Serpent posture)
- Salabhasana (Locust posture)
- Dhanurasana (Bow Posture)
- Anantasana (One sided)
- Makarasana (Crocodile posture)

⑤ Supine poses - give power and vigor (Lying on back)

- Naukasana (Boat Posture)
- Pawanmuktasana
- Sarvangasana (Standing on shoulders)
- Matsyasyana (Fish Posture)
- Halasana (Plough Posture)
- Chakrasana (Wheel posture)

⑥ Inverted poses - develop mental strength (Any pose in which the head is below from the ground than the feet)

- (Downward-facing dog) Adho Mukha Sarvangasana
- Viparita Karani (Legs up the wall)
- Balasana (Child Pose)
- Utharasana (Inward Fold Pose)

⑦ Stretching poses - brings lightness

- Tadasana (Mountain Pose)
- Utkatasana (Chair Pose)
- Utkatasana (Tree Pose)
- Garudaasana (Eagle Pose)
- Urdhva Hastha Padangusthasana (Extended Hand to - by - toe Pose)

⑧ Archa Vetsarjana (Half Crow Pose)  
• (Crow Pose) Sarvangasana  
• Reclining Pigeon Pose

⑨ Backbend poses - are exhilarating

- Bhujangasana
- Dhanurasana
- Salabhasana
- Matsyasyana
- Camel Pose
- Chakrasana
- Urdhva Mukha Shivasana
- Eka Pada Rajakapotasana

⑩ Jumping poses - are exhilarating

- Crow pose and crow pose peak Posen
- Baby crow yoga
- Achange Advanced series h Yoga Sequence
- Adho Mukha Sarvangasana, post which one jump through the arms into Utarangaasana (Caldate Pose) to followed to finally sit in Dandasana (Staff Pose)
- Achange Yoga sequences
- Core Yoga sequences

⑪ Forward bend poses - is softening

- Padmasana, Pawanasana
- Sheerangata Mudra
- Vajrasana, Vyana Mudra
- Janushirasana
- Paschimottasana (half forward bend) (full forward bend)
- Hanu Chakrasana
- Viparita Karanibho (Inverted pose)
- Pawanmuktasana (gar aleana pose)
- Sarvangasana
- Halasana
- Naukasana
- Akarna Matsyasyana
- Ekpada Hastasana
- Ujjwasana
- Vajra Ardha
- Adho Mukha Sarvangasana

⑫ Relaxation poses - grant mental peace

- Savasana
- Padmasana
- Supta Vajrasana
- Makarasana
- Matsya Kritasana
- Supta Bhujangakrasana
- Sarvangasana
- Balasana
- Sarvangasana

# Advantages

- Sitting Asana - opposite possibility to the hip, knee, ankles and the muscles of the groin.
- keeps spine steady, provides stability of the body and pacify the mind
- Naturally relaxing
- Reflective and meditative amount often comes more easily
- Standing Asana -> strengthens leg muscles and plants
- Increases the suppleness and strength of the spine and body
- The arteries of the legs are stretched, increasing the blood supply to the lower limbs, preventing varicose veins and thrombosis in the calf muscles
- tones the cardio-vascular systems, as the heart rate will naturally increase, due to the exertion required to maintain standing poses.
- The lateral wall of the heart is fully stretched, increasing the supply of blood to the heart.
- Twists -> improves the suppleness of the middle body and releases spinal, hip and groin disorders.
- The spine also becomes supple and this improves the flow of blood to the spinal nerves and increases energy levels
- They also squeeze the intestines, helping to detoxify the body

Inversions -> vital organs like the brain, heart and lungs are flushed with oxygenated blood

- Forward bends -> squeeze and massage the abdominal organs, improving digestion, relieving constipation and constipating weight gain.
- Has a unifying effect on the nervous system, as these organs relax, the frontal brain is cooled and the flow of blood to the entire brain is regulated.
- The sympathetic nervous system is cooled, bringing down the pulse rate and blood pressure.
- Stress is removed from the organs' perception and the senses relax.
- The adrenal glands are also cooled and function more effectively.
- Since body is mostly in horizontal position, the heart is relieved of the strain of pumping blood against gravity, and the blood circulates through all parts of the body easily.
- These bends also increase elasticity in the lumbar spine (improving any sciatic problems), intervertebral joints and ligaments.
- The hamstring are stretched as is the entire back body
- Back bends -> stimulates the central nervous system, assisting in the ability to bear stress.
- They help to relieve and prevent headaches and hypertension, and energize the body.
- Invaluable to people suffering depression, as it is released, as the chakra system opens to all back brain

Reclining Asanas -> peaceful poses which soothe the body and refresh the mind

- They are also preparatory asanas, as may help relax the body and calm the mind
- They give the body the required energy and focus the mind for strenuous asanas.
- They prepare you for pranayama
- it lowers blood pressure and stabilizes the body, often in sequence
- helps to remove the breath and cool the body and the mind
- with so much increased energy in the body from other asana practice, one may be left feeling "tired" if a rest pose is not performed at the completion of practice.

PRANAYAMA

Asana is meditation on the body, pranayama is meditation on the breath and subtle energy currents within us, and when we work with the mind directly with the ultimate aim of transcending body and mind and experiencing the divine self.

Eight types of Pranayama

- ① Nadi Suddha - sitting in a cross legged position, using one hand, close right side of the nose and breathe deep through left, vice versa, 15 times
- it brings balance to the mind, body, soul.

② Shitali Pranayama -

- Rolling lip - tongue in an O shape - inhale through mouth - hold the breath - practice slowly (jalandhar bandh) - exhale through nostrils, 15 cycles
- helps to cool the body
- Reduces anxiety

③ Ujjayi Pranayama -

- Sit cross-legged - breathing through mouth - try to mimic the sound of ocean waves by constricting the throat - close the mouth - breathing done through nose by constricting the throat, 15 times
- Gives relaxation
- Helps in throat related issues
- Alternative treatment for stress and PTSD, as it helps in reducing anxiety.

④ Kapalbhati Pranayama -

- Forceful exhalation and inhalation from lungs involuntarily
- Warm up
- Strengthens the diaphragm and abdominal muscles
- Helps in increasing focus, reducing anxiety and burn out

⑤ Anantika Pranayama -

- Sit cross legged - spine straight - close eyes - inhale and exhale at a fast rate
- Increases blood circulation in the body and

⑥ Bhramari Pranayama -

- Close the ears with thumbs and - eyes with the fingers - mimic the sound of a bee while inhaling and exhaling slowly, 5-10 minutes
- Helps in increasing concentration, alertness, memory improvement and reducing stress.

⑦ Anuloma & Viloma Pranayama -

- Inhale for 2-3 seconds - pause - gas out - inhale in - pause - inhale with lungs are full - exhale slowly
- Helps in relaxing, reducing stress and clearing of nasal passages.

⑧ Sheetkari Pranayama -

- Inhale air, while keeping the tongue behind the teeth - do the jalandhar bandh - hold the breath - exhale air through nostrils
- It helps to cool body
- It plays an important role in keeping the body temperature under control.



## → PRATHYAHARA

is a Sanskrit word meaning "withdrawal of the senses" from the body and from the environment.

The practice facilitates the journey into the inner world where there are no loud noises, advertisement to buy, lists to do, and other things that might distract us from our intelligent being.

It calms the mind, slows the mental stimulation and overflows the disturbed flow of prana. Also, used as a tool to root and bring us the control over the senses.

## → DHARANA

Means, "collection or concentration of the mind or "the art of holding, beating, waiting, supporting, maintaining, retaining, keeping back, a good memory", or "firmness, steadfastness, continuity".

## → DHYANA

The yoga of meditation. It teaches you to keep your mind off the unnecessary things and concentrate on what you need to do. Enables one to find the truth.

## → SAMADHI

is the experience of spiritual enlightenment when the self, the mind, and the object of meditation merge together into one.

The practice of equality - doing things that feed & nurture each aspect of your being.

## CONCEPT OF YOGIC PRACTISE

Yoga is essentially a spiritual discipline, based on an extremely subtle device, which focuses or brings harmony between mind and body. It is an art and science of healthy living. The word 'Yoga' is derived from the Sanskrit root 'Yuj', meaning 'to join' or 'to yoke' or 'to unite'.

Yoga practice is a wide range of practices with differing purpose, encompassing to the various forms yoga philosophy derived from the vedas, physical postures derived from Patanjali's Yoga. Yoga enables one to lead a good health and life. practice mental hygiene, physical, emotional, stability, integrative normal values and attain higher level of consciousness, hence yoga practice and its concept are very important to understand and lead.

### PRINCIPLES OF

- Breathing → Always breathe through the nose unless specific instruction. as given to the contrary.
- co-ordinate the breath with the asana practice.

• Awareness → here may be understood as curiously what happens in the body, the physical movement, the posture itself, breath control and synchronization, movement of prana, concentration on an area of the body or chakra, and, most importantly, witnessing any thoughts or feelings that may arise.

• Relaxation → Shavasana may be performed at any point during asana practice, especially when feeling physically or mentally tired. It should also be practiced on completion of the asana program.

• Sequence → After completing, Shatkarma, asana should be done, followed by pranayama, then pratyahara and dhyana which lead to meditation.

• Counter Pose → when practicing the middle and advanced group of asanas, particularly, it is important that the program is concluded so that backward bends are followed by forward bends and vice versa, and that inversion is practiced on one side of the body is repeated on the other side. This concept of counter pose is necessary to bring the body back to a balanced state.

• Time → The best time to practice is early in the morning or late in the evening; in the morning asanas do not come easily as the body is stiff. In the evening, the body moves more freely than in the morning, and the asanas come better with greater ease.

• Place → They should be done in a clearly dry place, free from insects and noise. Do not do them on the barren floor or on an uneven place, but on a mat, folded blanket or on a leveled floor.

• Clothes → During practice, it is better to wear loose, light and comfortable clothes. Things with metals or anything that can be harmful, like watches, jewelry, etc. should be removed before practice.

• Bathing → Asanas come easier after taking a bath, once done; a bath should be taken again as the body feels sticky due to perspiration. Taking a bath or shower before and after starting the asanas, refreshes the body and mind, and the sequence is also done with great ease.

• Emptying the bowels → It is important that there is no excess of food or undigested material in the body before starting the asanas or pranayama. Usually, it is better to keep good hours gap between the last meal and yoga, so that there is enough time for digestion, and the body with naturally purge. This is best so that the sessions are more effective, enjoyable and concentration is much better in an empty stomach.

• Stomach → should feel light and free, so that the yoga can help one escape gas and air's comfort.

• Diet → usually eat light diet or the diet based on fruits that contain one of the three yogas qualities known as Sattva. Foods that are pure, light, sweet are to be consumed.

• No Straining → Yoga must be done with free mind, without any worries or stress, only when will it be effective and concentration will be better.

• Age → Yoga practice may be done by people of all age, groups, males and females.

### CONTRA INDICATIONS.

A contraindication is a specific situation in which a particular pose or breathing exercise is not advised, because it could jeopardize one's health. Such conditions include low back pain, shoulder injury and pregnancy. Injury prevention lies within the hands of both students and teachers.

• Pregnancy → No opposite asana  
• Adhama core → strengthening, inversion, dynamic asana, intensive backbend, poses that compress the abdomen or cause excessive twisting

• Sutrakia → No forward bend  
• No extreme backbend  
• Knee Pain → No Poses with erect inverted posture or one knee or both the knee beyond 90 degree of motion.

• Head & Neck → Recommended inversion and slow-paced form of yoga  
• No core strengthening of abdominal compression or twisting asana.

• Hypertension → Avoid inversion poses  
• No abdominal pressure, such as downward dog, Sarvangasana, handstand or Setu Bandha Sarvangasana

• Frozen shoulder or injury → Avoid asana which stretch the shoulder with or put weight on the joint.  
Focus on strength building instead of stability.

• Lower back pain → Avoid advanced forward and backward bending postures.  
Most of the pain is lower back, work to press pressure, work back muscles and spinal innervation.

• Surgery → If you have had undergone surgery or not, it is an excellent, should avoid yoga for at least three months.  
• before engaging in recovery practice, it is advisable to consult the doctor.

• Hip, wrist and ankle injury or Pain → Hip, wrist and ankle is important in such conditions.  
• In case of severe pain in any body part, avoid asanas that can add strain, stretch or flex that joint.

### INVERTED ASANAS

is the region of gravity on the body. It encourages the blood flow to brain.

#### Benefits:

- Reduces stress
- Anxiety level decreases
- Increases self confidence
- Increases mental power and concentration
- Massage of the abdominal organs

#### Types:

- Chakrasana
- Shirshasana
- Vipitika
- Uttarasana
- Setu Bandha Sarvangasana
- Karmasana

## SUNBATHING

• The scientific process that keeps the body healthy.

• The best time to take sunbath is before 8:00am and after 5:00pm, as the heat of the sun at that time is desirable and does not harm the body.

• Start with 5-10min for a while and gradually increase it to 15-20min max.

• Not to be done after meals.

• Gives Vitamin D

#### Benefits:

- Skin texture
- Helps to weight loss
- Increases happiness
- Keeps hair healthy
- Boosts immune system
- unclog blood vessels
- helps babies grow tall
- Bolsters hormonal system
- Treats skin conditions

#### Vitamin: D and its importance:

- Essential to keep one healthy and fit.
- 90% Vitamin D is received from the sun.
- Inadequate vitamin D can cause serious damage to the bone and result in weak bones.
- Vitamin D helps our immune system to

## SURYANAMASKAR

is the most useful and popular mode of yoga exercises, which largely benefits the benefits of Asanas, pranayama and mudras, pratyahara. It consists of a series of 12 postures, which are performed early in the morning, facing the rising sun. Suryanamaskar exercises the entire neuro-glandular & neuro-muscular system of the body and this regular practice, ensures a balanced supply of oxygenated blood and perfect harmony to all the systems of the body, thus purifying the entire psychosomatic system of human constitution.

### Steps to Surya Namaskar -

#### Position 1

### PRANAMASANA (Prayer Pose)

Procedure → Standing Posture, facing the sun.  
• Both feet should touch each other, palms joined together, in prayer pose.

#### Position 2

### HASTA UTTARASANA (Raised Arm Pose)

Procedure → With deep inhalation, raise both arms above the head and tilt slightly backward, arching the back.



**Position 3**  
**HASTAPRASANA (Hand to Foot Pose)**

**Procedure** → With deep exhalation, bend forward and touch the mat, both palms to the floor with the feet, forehead touching the knees.

**Breath** → Exhale

**Position 4**  
**ASHWA SANCHALANASANA (Equestrian Pose)**

**Procedure** → With deep inhalation, take the right leg away from the body to a big backward step.

- Both the hands should be firmly planted on the mat, the left foot between the hands, head tilted towards the ceiling.

**Breath** → Inhale

**Position 5**  
**PARVATASANA (Mountain Pose)**

**Procedure** → With a deep exhalation, show the hips and butt up towards the ceiling, forming an upward arch.

- The arms should be straight and aligned with the head.

**Breath** → Exhale

**Position 6**  
**AISHANGH NAMASKARA (Salutation with eight parts of the body)**

**Procedure** → With deep exhalation, lower the body down till the forehead, chest, knees, and feet are touching the mat, the butt lifted up.

- Take normal breath in this pose.

**Breath** → Return breath/hold

**Position 7**  
**BHUVANJASANA (Cobra Pose)**

**Procedure** → With deep inhalation, slowly snake forward, lift the head as high as possible.

**Breath** → Inhale

**Position 8**  
**PARVATASANA (Mountain Pose)**

**Procedure** → Exhale deeply, again push the buttocks and hips up, toward the ceiling, as in position 5, arms aligned straight with the head.

**Breath** → Exhale

**Position 9**  
**ASHWA SANCHALANASANA (Equestrian Pose)**

**Procedure** → Inhale deeply, bring the right foot to touch the body, to a big forward step. Both the hands should be planted firmly on the mat, right foot between the hands, head tilted towards the ceiling.

**Breath** → Inhale

**Position 10**  
**HASTAPRASANA (Hand to Foot Pose)**

**Procedure** → Exhale deeply, rise up and touch the mat, keeping both the palms to the floor with the feet, forehead touching the knees.

**Breath** → Exhale

**Position 11**  
**HASTA UTTANASANA (Raised Arm Pose)**

**Procedure** → Inhale deeply, raise both the arms above the head and slightly backward.

**Breath** → Inhale

**Position 12**  
**PRANAMASANA (Prayer Pose)**

**Procedure** → Return to stand facing the mat, both feet touching, palms joined

**STEPS OF SURYA NAMASKAR**

- 1 PRANAMASANA
- 2 HASTA UTTANASANA
- 3 HASTA UTTANASANA
- 4 ASHWASANCHALANASANA
- 5 PARVATASANA
- 6 BHUVANJASANA
- 7 PARVATASANA
- 8 BHUVANJASANA
- 9 ASHWASANCHALANASANA
- 10 HASTA UTTANASANA
- 11 HASTA UTTANASANA
- 12 PRANAMASANA

**CHAKRAS**

- Literally mean "spinning wheel"
- Chakras are various focal points, used in variety of ancient meditation practices, collectively.
- This system refers to 7 energy centers we have in our bodies. There are seven major chakras, each to a specific location along the spine.

**7 (SEVEN) CHAKRAS OF THE BODY**

- 1 Muladhara (Root chakra)
- 2 Svadhisthana (Sacral or pelvic chakra)
- 3 Manipuraka (Navel chakra)
- 4 Anahata (Heart chakra)
- 5 Vishuddha (Throat chakra)
- 6 Ajna (Third eye chakra)
- 7 Sahasrara (Crown chakra)

**1 Muladhara Chakra (Root chakra)**

- Location → Pelvic floor
- Element → Earth
- Color → Red
- Sound → Lam
- Pose → Vasisthasana (Tree Pose)

The root chakra is located at the base of your spine. It provides you with a base or foundation for life, and helps you feel grounded and able to withstand challenges.

**2 Svadhisthana Chakra (Sacral Chakra)**

- Location → In the sacrum
- Element → Water
- Color → Orange
- Sound → Yam
- Pose → Deiviana (Fiddler's Pose)

The sacral chakra, or svadhisthana, is located just below your belly button. This chakra is responsible for your sexual and creative energy. It's also linked to how you relate to your emotions as well as the emotion of desire.

**3 Manipuraka Chakra (Navel Chakra)**

- Location → Just below navel
- Element → Fire
- Color → Yellow
- Sound → Ram
- Pose → Navasana (Boat Pose)

This chakra is located in the stomach area. It's responsible for confidence and self-esteem, as well as helping you feel in control of your life.

**4 Anahata Chakra (Heart Chakra)**

- Location → Center of the chest
- Element → Air
- Color → Green

The heart chakra is located near your heart, in the center of your chest. It comes as no surprise that this chakra is all about your ability to love and show compassion.

**5 Vishuddha Chakra (Throat Chakra)**

- Location → Throat, near salivary glands
- Element → Ether
- Color → Blue
- Sound → Ham
- Pose → Sarvangasana (Shoulderstand)

This chakra has to do with our ability to communicate.

**6 Ajna Chakra (Third eye chakra)**

- Location → Eyebrow level, mid-brain
- Element → Light
- Color → Indigo
- Sound → Om
- Pose → Sukhasana (Easy pose)

This chakra is located between the eyes. This chakra provides the mind eye or "strong gaze". The mind eye is responsible for intuition and is also linked to imagination.

**7 Sahasrara Chakra (Crown chakra)**

- Location → Crown of head
- Element → Thought
- Color → Violet
- Sound → Om
- Pose → Savasana (Corpse pose)

Located at the top of the head. This chakra spreads your spiritual concentration to yourself, others and the world.

**Benefits of chakra:**

- Physical health and well-being
- Beneficial for spiritual fitness
- Removes bad energy stored in the body
- Enables you to enjoy to the fullest
- Allows you to know your inner self
- Transforms your weakness into your strength
- Grants access to your spiritual wisdom
- Enables you to live dreams into reality
- Provides intuition
- Allows you to express and release emotions in a healthy manner.

**NADIS**

- Nadi is a Sanskrit word, which means "tube", "channel" or "flow".
- It is used to describe the network of channels which allow energy to travel through the body.
- From the nadi energy which is required to help all living things flourish.

There are 3 main nadis within the human body:

- 1 Ida Nadi → It is also known as left channel, this starts in the root chakra (muladhara).
- 2 Pingala Nadi → It flows to the right, in and out of the other chakras, up the spine & ends up at the left nostril.
- 3 Sushumna Nadi → It represents mental energy.



- ② **Padma Nadi** - It is also known as Right channel, and starts in the same place - the sacrum
- It flows to the right, up the spine and ending at the right nostril
  - It is the origin of prana - the person's life force

- ③ **Sushumna Nadi** - It is called on central channel, it runs straight up the spine, through all the chakras
- Starting just below the root chakra, it leads up to the crown chakra - the Sahasrara
  - It is the seat of spiritual

### Benefits of Nadis:

- Increase flow of oxygen to the cells, opening & releasing physical and emotional stress
- Deeply relaxes the muscles, reducing aches and pains, neck rigidity and headaches
- Stimulates the immune system from the broad base of the spine to the muscles & cells
- Total relaxation, producing a state of calm, peace and reducing nervous tension
- Improves circulation to the scalp, stimulating the hair & helping hair growth

## UNIT - 2

### SHARIRIYAS

- Shat (Six) Kriyas (Action) - consists of 6 types of purification practices
- These kriyas are practiced before asanas, pranayamas and other yogic practices, in order to purify the body of its toxic impurities

### Types of Kriyas -

- Neti
- Dhanu
- Nandi
- Chak
- Kapalapata
- Tanaka

**Neti** - A process of cleansing and purifying the nasal passages

- Types -
- Jala Neti - warm water
  - Sutra Neti - rubber tube
  - Dugdha Neti - warm milk
  - Ghrita Neti - warm clarified butter or ghee
  - Masuri Neti - inflow of one's own urine

- ① **Jala Neti** - A Jalneti pot full of sterile salt lukewarm water
- Stand with the legs apart, slightly bent forward
  - Insert the nozzle of the neti pot into the right

- Keep the mouth open and breathe freely through the nose
- Tilt the head slightly backward, then forward and side wards to the left, so that the water from the pot enters the right nostril and comes out through the left by gravity. Allow the flow till the pot is empty

To clear the nasal passage of the remaining water, blow out the water by other nostril through releasable nostril as in Kapalabhati

② **Sutra Neti** - an ancient Indian practice of passing a thread or similar material like a rubber catheter through the nose and out of the mouth

③ **Dugdha Neti** - is a yogic cleansing practice used to clear the nasal passages with a special neti pot filled with milk, pre-warmed to body temperature

④ **Ghrita Neti** - is a yogic practice similar to Jala Neti

⑤ **Masuri Neti** - is a traditional technique used by some ancient yogis of using one's own urine (which by drinking it or managing it into the body) for therapeutic or spiritual purposes

### Benefits -

- It helps to remove mucus of pollen, from the nasal passages and sinuses, allowing us to breathe without obstruction

- Helps to maintain good health of ears, eyes and throat
- Has a calming and soothing effect on brain
- Reduces cold and flu symptoms
- Reduces sneezing
- Improves sense of smell and taste

**DHAUTI** - is the cleansing of the entire digestive tract

Procedure - Sit in Padmasana, and breathe deeply

- Exhale, emptying the lungs as much as possible
  - Lean forward slightly, straightening the elbows
  - Push down on the knees with the hands and perform Jalambhara Bandha
  - Contract and expand the abdominal muscles rapidly for as long as it is possible to hold the breath without discomfort. Do not strain Klesha, Jalambhara Bandha
  - When the head is upright, take a slow, deep breath in. This is the end
  - Repeat with the breathing normalised, before rearing the next round
- Benefits -
- It stimulates the appetite and improves digestion
  - It massages the abdomen, strengthens the abdominal muscles and encourages optimum health of abdominal organs
  - It alleviates depression, dullness and lethargy

**NAULI** - A process of giving an abdominal massage

Procedure - Firstly, empty the bowel and keep the stomach free

In standing, lean forward with hands on the floor

Exhale and hold the breath out

Repeat this for 8-10 minutes and relax

Benefits -

- Improvement of venous outflow
- Stimulation of a large intestine
- Strengthening of respiratory muscles
- Stimulation of peripheral blood circulation
- Lowering of arterial pressure
- Stimulation of endocrine system

**BASTI** - A complete process of cleansing the intestines

Procedure - water lub, subject squats in the tub, water must come up to the navel

lean forward, resting the hands on the knees

Mula Bandha is repeated

Benefits -

- Replenishes the bowels
- Cures digestive disorders
- Balance the diet
- Enhance skin tone
- Stimulates brain process
- Acts as a stimulant practice

**KAPALBHRATI** - It is the cleansing process of skull and frontal part of the head

Procedure - Sit in a comfortable pose with eyes closed

Inhale normally followed by exhale forcefully

Repeat this for upto 6-10 cycle

Benefits -

- Cures digestive system
- Purification of "Kundalini"
- Improvement of concentration
- Reduces blood sugar level
- Benefits for health, brain/nerve, skin and hair
- It helps to weight loss and is good for heart

**TANAKA** - It is the cleansing process of the eyes

Procedure - Sit in a comfortable pose with any posture

Place a candle in front of a candle, place hand at arm length away from subject

Open the eyes, look at the flame without blinking

Concentrate on the flame without creating any tension

Repeat the practice, 3 times

Benefits -

- Purifies the eyes
- Strengthen the eye muscle & improves vision of memory
- Helps in sleeping difficulty
- Strengthens the ability to concentrate, recommended for school children

### BANDHAS

or to hold, tighten or lock, specific locks and holds of the semi-voluntary and involuntary muscle in the body

Bandha practice, aims to lock the prana at particular areas and restrict rest flows into Sushumna nadi

### Types of Bandhas -

- Jalandhara Bandha
- Uddhiyana Bandha
- Moola Bandha
- Maha Bandha

### Jalandhara Bandha (Throat lock)

Neti  
↓  
Stream/Flow

This lock controls the network of Nadis in the neck

Execution - Sit in a fixed blanket in Siddhasana or any other comfortable posture

Place the palms on the knees, keep the neck and the spine straight, close the eyes and relax the whole body

Inhale slowly and deeply with stretch, the neck forward and press the chin firmly against the chest

Strengthen the arm by pressing the knee down with the palms

Then bring the chin up and exhale

- Benefits -
- Stimulates the throat, enhances thyroid function and regulates the body metabolism
  - Stimulates the parathyroid for calcium management

**Uddhiyana Bandha (abdominal contraction)**

"to rise up" or "to fly" upward

Uddhiyana bandha must always be practiced on an empty stomach and the bowels should also be empty, increased complexity

Execution - Sit erect in any meditation pose

Inhale deeply through the nostrils

Place your hands on the lower thighs, just above the knee cap

Take a couple of deep breaths to let proper flow of prana throughout the body

Exhale the breathe completely, and hold it

Now, draw the navel part to and try to touch your spine, then lift it towards the 10th cage or lower 11th cage, holding the breath

Hold it for a few seconds, according to your comfort, then drop it gently

Benefits - The inner organs and glands are massaged and toned

It provides mass blood and prana circulation in the overused area

It removes lethargy and soothes anxiety and tension

**NAULI** - A process of giving an abdominal massage

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Benefits - The inner organs and glands are massaged and toned

It provides mass blood and prana circulation in the overused area

It removes lethargy and soothes anxiety and tension



## Moola Bandha (root lock)

Location - **\* firmly fixed, cause**  
Moola Bandha is effective in releasing  
bindu gathi and for binding and unbinding  
mooladhara chakra.

Location - **\* Sit and in Siddha / Siddha position**  
From and sit in the seat, against perineum -  
the area between the genitals and anus.

- Take deep long breaths and relax the body and mind
- Reverse moola and aghori / vajras' moola for  
concrete

• Exhale slowly without the anus muscles behind,  
pull it forward.

Withdraw the perineum, lift up, contract and hold it  
for one time and then release with breathing to 5 or  
10 times.

- Observe the breathing in the mooladhara - above the  
perineum area.

• After mastering the practice of contraction over  
mooladhara chakra - Bindu gathi, now the cause  
practice. Do work with breathing in retention uttara -  
Kumbhakar.

• Initiate to the neptunium hold the breath.

• Now apply the moola bandha, contracting the genital  
anus and perineum with drawing and lifting up and  
holding with unbound retention - uttara kumbhaka, as  
long as possible.

• Then, release the hold and let loose the contraction.  
Exhale - do for 5-10 times. Observe the breathing  
in the mooladhara.

benefits - **\* It improves many physical, mental  
and spiritual benefits.**

• It releases wrinkles and breaks piles  
• It is beneficial for anal fissures, ulcers, prostates,  
pelvic infection.

• It relieves depression, suppression and sex guilt  
and perversions.

• The ovaries in the female and the prostate  
gland in the male receive an increased blood  
circulation.

• There is some possibility that Moola Bandha is  
a c/s in discharging or pairing soft kidney and  
bladder stone.

• It affects the central and sympathetic nervous  
system, reducing tension, therefore offering  
subjective rejuvenation of the urogenital  
region.

## Jihva Bandha

Good

- Release the position when strain is experienced.
- They are to be performed only in the morning or  
late at night.

## Types of Mudras -

- **Hasta Mudra (Hand Mudras)**  
Asamprukta Hastan Mudra (Single-hand mudra)  
Samprukta Hastan Mudra (Both hands)
- **Manu Mudra (Heart Mudras)**
- **Lehya Mudra (postural Mudras)**
- **Bandha Mudra (Lock Mudras)**
- **Astha Mudra (Special Mudras)**

## HASTA MUDRA (Hand Mudras) -

They engage the motor cortex at a very subtle  
level. They generate a loop of energy which moves from the  
brain down to the hand and then back again. They  
redirect the mana emitted by the hands back into the  
body. Eg -> Chin mudra, Varaha mudra

## Techniques -

- Joining the tips of the fingers or pressing by thumb,  
square and balance repetitive elements in the body
- Initially, mudras should be performed for at least  
10 minutes and then can be extended to 30 minutes or more.

Examples - **Khyana Mudra (Mudra of knowledge)** ->  
Join tips of index fingers and thumb and keep three  
fingers straight - keep your hand at your folded knee,  
comfortable to keep palm facing up. Put a little pressure on  
joined tips and rest of the hand would be in relaxed  
position.

**Bhumi Mudra (Mudra of Earth)** ->  
The tips of the index fingers and thumb meet. The tips of the thumb  
and index fingers meet. The tips of the middle and ring fingers meet.

## \* Varaha Mudra (Mudra of water) ->

Tip of little finger touches the tip of thumb with  
the other three fingers stretched out.

**\* Vajra Mudra (Mudra of Air) ->**  
Keep the index finger on the base of the  
thumb and press with the thumb keeping the  
other three fingers straight.

**\* Shunya Mudra (Mudra of Emptiness) ->**  
Keep the middle finger at the mount of Venus  
and press with the thumb.

benefits - **\* Mudras help to link the brain to the  
body, reduce pain, stimulate endorphins, change the  
mood and increase or relax.**

- Helps to increase concentration, memory, reduces sleep  
disturbance.

• Helps to release stress and anger, causes depression

• It increases determination and breaks individual  
barriers spiritually.

• It transports spiritual power to the eyes

• Boosts metabolism and immune system

• It eliminates stress, increases blood flow and  
reduces muscle aches.

• Helps to decrease the arthritis, neck pain, trembling  
in Parkinson's disease.

• Helps eliminate excess gas/air related problem like  
bloat, constipation.

**\* Hastas are primarily classified as**  
28 asamprukta hastas (one-hand gesture)  
24 samprukta hastas (two-hand gesture)

Each of the hastas can be used to derive various  
thoughts, ideas and virtues.

## \* MANU (Hand mudras) -

Hand mudras form an integral part and part of  
Kundalini yoga. They help for meditation. They will be

## UNIT 3 - MUDRAS

Mudras, in Sanskrit means "seal".

It is a gesture, usually done with the hands, which  
focuses and directs energy in a yoga pose or meditation.

They are yoga movements involving only the arms and  
hands. They are called the "yoga of the hands".

Mudras influence five elements in the human body.  
The 5 fingers of the hand represent the 5 elements.

- The thumb - ego (fire)
- five finger - rage (air)
- middle finger - anger (earth)
- ring finger - pride (water)
- little finger - fear (ether)

Mudra balances the 5 elements to avoid diseases.

benefits -

• They are universal and suitable for everyone.

• Mudras can be practiced in all ways, walking, sitting,  
standing and even lying down.

• Mudras can be done even by patients in a simple  
way of preserving one's health.

• They provide instant relief in many situations.

## Techniques -

- Wash your hands before the start of mudras
- Other fingers from the opposite hand always be  
relaxed.

## Types -

**\* Shambhavi mudra** - looking towards the eyebrow  
centre strengthens the eye muscles.

**\* Nandkya dotahit** - looking towards nose tip helps in  
calming anger and releasing disturbed emotions.

**\* Khechari mudra** - touching the tongue to the  
upper palate stimulates the parasympathetic system.

**\* Kaki mudra** - while sitting at the nose tip,  
press the tips together.

**\* Bhruvaki mudra**

**\* Mani mudra**

**\* Shanmukhi mudra**

benefits - **\* It calms the mind**

• It removes the aura's to the temples

• helps in relaxation and reducing a state of  
mindfulness.

• helps in sitting in meditation for long periods.

• Soothes joints with rheumatism, low back pressure

• Enhances concentration and prevents insomnia.

• Increases memory power and sharpens the mind.

• calms the nervous system.

## KATA (postural mudras)

These mudras are physical postures combined  
with breathing and concentration. Eg -> Vipraschita  
Khand Mudra and Yoga mudra.

**\* Parshva mudra** ->  
This mudra brings balance and brings the  
five senses system and induces pranidhana (one  
with spiritual). It has all the benefits of Khechari.

**\* Pada mudra** -> After sitting in Padmasana, the hands  
press the mooladhara, samadhi bhava manjira and  
anahata chakra. Followed by open arms. This mudra  
awakens the vital energy and distributes it through  
the body.

**\* Shirogala mudra** -> Also known as Anuloma  
as child pose in a relaxation as one it releases  
the spine while unblocking the abdominal organs.

**\* Yoga mudra** -> Nageswari mudra is relaxation of all  
the muscles and organs. It develops concentration and  
stimulates the manjira chakra.

**\* Mooladhara Mudra** -> The frog gesture is a  
mudra for well-seated meditative asana. It  
activates the mooladhara chakra. It calms the  
disturbance of the mind and nerves.

**\* Tadagi Mudra** -> Also known as the barrelled  
abdomen technique. It releases tension stored in the  
diaphragm and pelvic floor. It tones the level of  
pitta and stimulates the manjira chakra.

## BANDHA (Lock Mudras)

Lock mudras combined mudra and bandha. They  
change the body with pitta and prepare it for  
Kundalini awakening.

Types - **Mula Bandha (see root lock)**  
**Jihva Bandha (see throat lock)**  
**Uddiyana Bandha (lifting of the diaphragm)**



## ADHARA (Pranava Mudra) -

They radiate power from the bottom of the spinal cord to the brain. They are performed on one palmic stress line.

### Technique -

- Sits in Padmasana / Ardha Padmasana / Sukhasana
- Back straight
- Use upper carpet or mat, to prevent the radiations coming out of the joints
- Hands are held in front of the navel. Bring the palm together in proper position in front of the abdomen, fingers tips facing away from the nose.
- Keep the fingers and the wrist together, spread the thumb out to the side, creating space between the palm.
- Relax the shoulder and let the forearm rest against the abdomen.
- Take several natural breaths in order to let feelings and sensations evoked by the mudra.

### Types -

- Maha Mudra (Great)
- Ashwini Mudra (Horse)
- Vajra / Sanyog Mudra (Thunderbolt / Synthesis)
- Maha Maha Mudra (Great separating mudra)
- Maha Veksha Mudra (Great viewing)

### Benefits -

Helps to direct energy and back to the solar center of the body to cultivate deeper connection with one's energy and potency.

## MEDITATION

Derived from the Latin verb "meditari", meaning "to think", "contemplate", "devote", "ponder" and "meditate".

It is an intensely personal and spiritual experience. The distinct purpose of each meditation technique is to channel normal waking awareness into a more positive direction by totally transforming one's state of mind. It is a spiritual practice that binds the mind, body and soul together.

### Techniques -

The regularity of time - Some time to be meditated everyday so that the mind can settle down at that time.

The place - very important. A quiet and peaceful place with a cooling atmosphere is a must for dhyaana.

The most effective time - The dawn and dusk, that is, the Brahman mahurat and the evening, when the winds is changed with a high spiritual fire and energy.

Direction - When sitting, face north or east or west, in order to take advantage of favorable magnetic and solar vibrations.

Nothing - Don't eat, wear, eat, allow the breath and feel relaxed.

Eyes closed, back straight, legs crossed in any meditation posture like Bhadran, Siddhanta, padmasana.

Palms rest on the knee, joining up with the big toe line.

Consciously regulate the breath. Begin practice with 11 minutes and extend to 45 min. or 1 hour.

Meditation is an effortless movement of the mind and this should be done without focusing on clearing the body or mind.

### Benefits -

- Physiological benefits -
  - It lowers oxygen consumption
  - Increases exercise tolerance
  - Helps in post-operative healing
  - Becomes immune reaction
  - Helps with weight loss
  - Good for people with high blood pressure
  - Enhances the immune system.

### Psychological benefits -

- Bridges self-confidence
- Helps control our thoughts
- Reduces nervous behavior
- Our appearance
- Higher intelligence growth rate
- Reduces mood swings
- Increases sense of responsibility
- Prepares you for change

### Spiritual benefits -

- Increased uniformity in appearing self
- Increased self-actualization
- Helps keep things in perspective
- Helps one devote their purpose
- Provides peace of mind, happiness

## Active Yang style of meditation -

This form of meditation involves writing on cards to color one's computer, charting mind. Meditative anchors, include focusing on the breath, a mantra, an image, or a thinking candle.

The meditator follows a set of predetermined rules to help guide them through the experience.

## Passive Yin style of meditation -

Here, the meditator remains open and receptive throughout and doesn't try to filter their experience in any way. They allow their natural experience to unfold. The practitioner allows their mind to acknowledge any thoughts or sensations that may arise.

YIN MEDITATION	YANG MEDITATION
<ul style="list-style-type: none"> <li>Allowing the mind</li> <li>Not focusing on experiences</li> <li>A receptive and passive form of meditation</li> <li>Open-ended experience to explore your inner landscape</li> <li>Use a mantra to come back to when you need grounding</li> <li>Come to understand your inner world</li> <li>Develop wisdom, compassion and tolerance</li> <li>Allow space for negative emotions and reactions</li> </ul>	<ul style="list-style-type: none"> <li>Controlling the mind</li> <li>Filtering out certain experiences</li> <li>A direct and active form of meditation</li> <li>Specific focus, e.g., mantra, breath, body, etc</li> <li>Use an anchor to ground you into your practice</li> <li>Find peace within your inner world</li> <li>Develop calm, concentration and equanimity</li> <li>Focus on creating a physical, emotional and physical state.</li> </ul>

## SANYOGA MEDITATION -

form of the deep yogic practice in which the yogi concentrates on something perceptible. A common focus in sanyoga meditation during yoga practice is on the breath, but focus could be on a mantra or image too. In this sense, the focal point is referred to as bhakti.

Sanyoga comes from the Sanskrit meaning "with attention".

- Types -
  - Pranava, a technique referred to as pranayoga
  - giving not attention both visualization and concentration
  - Types, which will use mantras, repeated clearly or aloud, to calm and focus the mind.

## NIRGUNIA MEDITATIONS -

Although sanyoga meditation moves the yogi along the path to enlightenment and calm with the. With self, it is through nirguna meditation that such union is achieved. Here, the yogi becomes one with the divine.

V. Pooch!

# Certificate

Name: **M-AMIRTHARAJ** Class: **M-Ped II**

Roll No: **010** Exam No:

Institution: **YHCA College of physical education**

This is certified to be the bonafide work of the student in the \_\_\_\_\_ Laboratory during the academic year 20 / 20

No. of practicals certified \_\_\_\_\_ out of \_\_\_\_\_ in the subject of \_\_\_\_\_

Teacher in charge

Examiner's Signature: \_\_\_\_\_ Principal

Date: \_\_\_\_\_ Institution Rubber Stamp

(S.P. the candidate is expected to retain his/her journal till he/she passes in the subject.)

## On the Anniversaries of the Heavenly Spheres.

- 1609 Galileo Galilei built his first telescope.
- 1687 Isaac Newton published Philosophiæ Naturalis Principia Mathematica (The Mathematical Principles of Natural Philosophy).
- 1705 Edmund Halley published A Synopsis of the Astronomy of Comets.
- 1800 Alessandro Volta invented the electric battery.
- 1869 Dmitri Mendeleev published the Periodic Table.
- 1873 James Clerk Maxwell published A Treatise on Electricity and Magnetism.
- 1885 Wilhelm Conrad Roentgen discovered X-rays.
- 1897 J. J. Thomson discovered the electron.
- 1900 Max Planck published information on Planck's constant.
- 1901 Guglielmo Marconi broadcast the first transatlantic radio signal.
- 1905 Albert Einstein published his special theory of relativity.
- 1922 Niels Bohr was awarded the Nobel Prize in Physics for his work on the structure of atoms.
- 1929 Dr. Edwin Hubble discovered what is now known as 'Hubble's Law'.
- 1930 Sir Chandrasekhara Venkata Raman received the Nobel Prize in Physics for his 'Raman Effect'.



# KINESIOLOGY

NAME : M. AMIRTHARAJ

CLASS : M.P. ED. II

Roll.No.: 2019031010

Submitted to: Dr. Johnson Premkumar

Teacher's Signature

## Various Joints of human body

1. Pivot joints
2. Ball and socket joints
3. Hinge joints
4. Sliding joints
5. Saddle joint

Teacher's Signature

## Pivot Joints

Pivot joints consists of the rounded end of one bone fitting into a ring formed by the other bone. This structure allows rotational movement, as the rounded bone moves around its own axis.

An example of a pivot joints is the joints of the first and second vertebrae of the neck that allows the head to move back and forth.

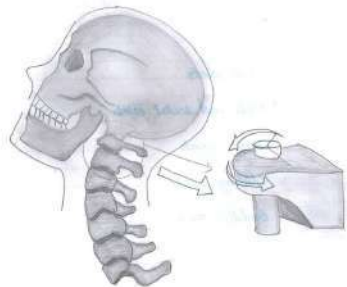
Teacher's Signature

## Ball and Socket Joints

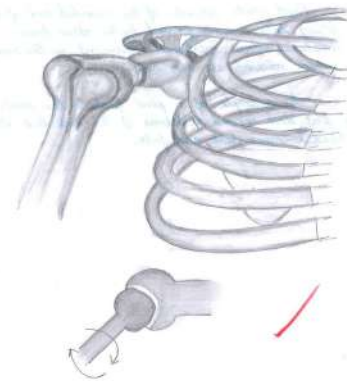
Ball-and-socket joints possess a rounded ball-like end of one bone fitting into a cuplike socket of another bone.

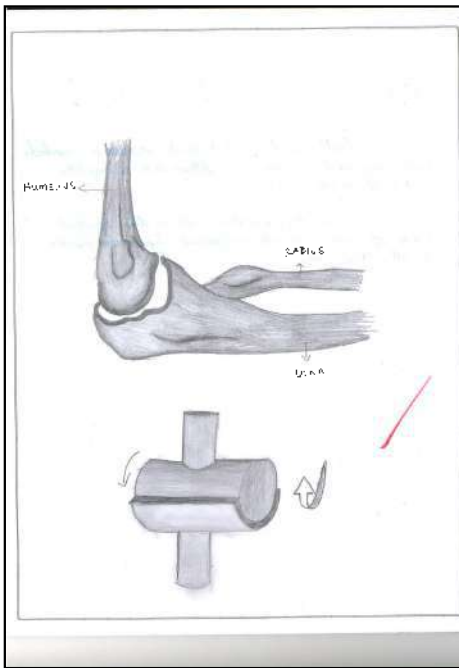
This organization allows the greatest range of motion, as all movements types are possible in all directions.

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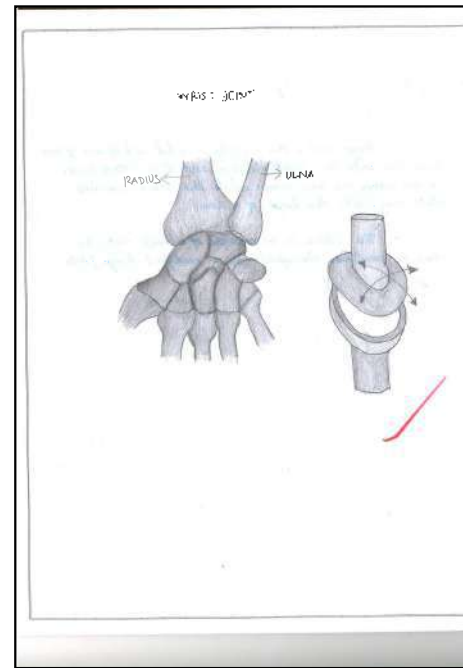
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## Hinge Joints

Hinge joints, the slightly rounded end of one bone fits into the slightly hollow end of the other bone. In this way, one bone moves while the other remains stationary, like the hinge of a door.

The elbow is an example of a hinge joint. The knee is sometimes classified as a modified hinge joint.

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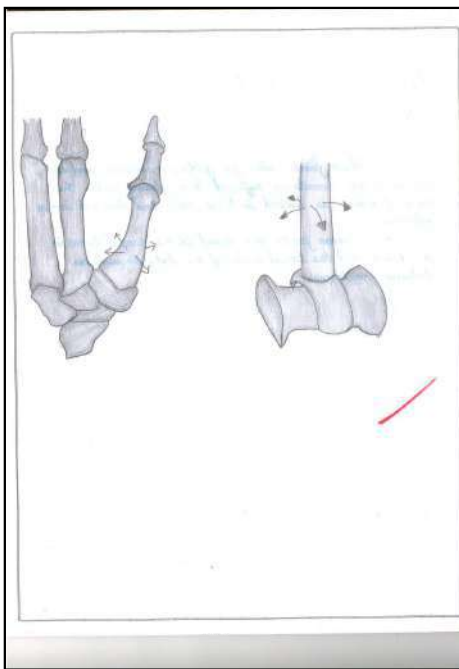
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## Gliding Joints

These joints allow for gliding movements, and so the joints are sometimes referred to as gliding joints. The range of motion is limited in these joints and does not involve rotation.

Planar joints are found in the carpal bones in the hand and the tarsal bones of the foot, as well as between vertebrae.

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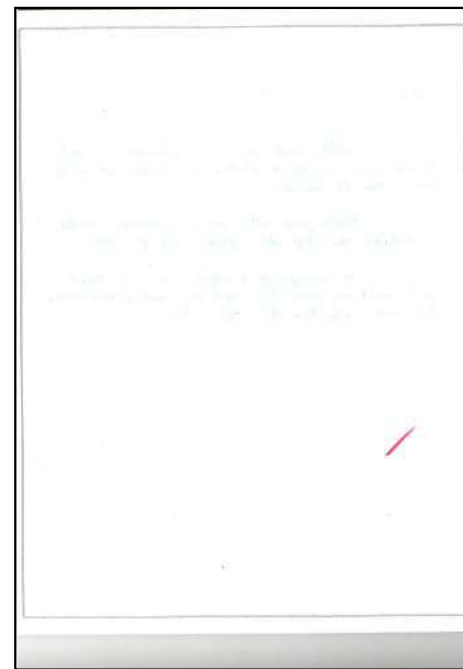
## Saddle Joints

Saddle joints are so named because the ends of each bone resemble a saddle, with concave and convex portions that fit together.

Saddle joints allow angular movements similar to condyloid joints but with a greater range of motion.

An example of a saddle joint is the thumb joint, which can move back and forth and up and down, but more freely than the wrist or fingers.

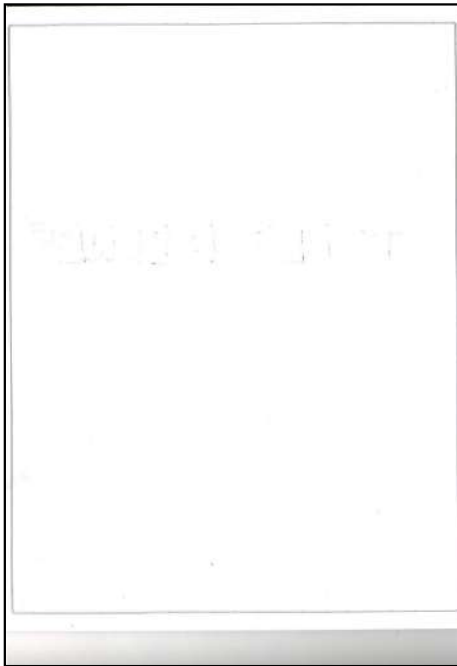
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# TYPES OF BONES

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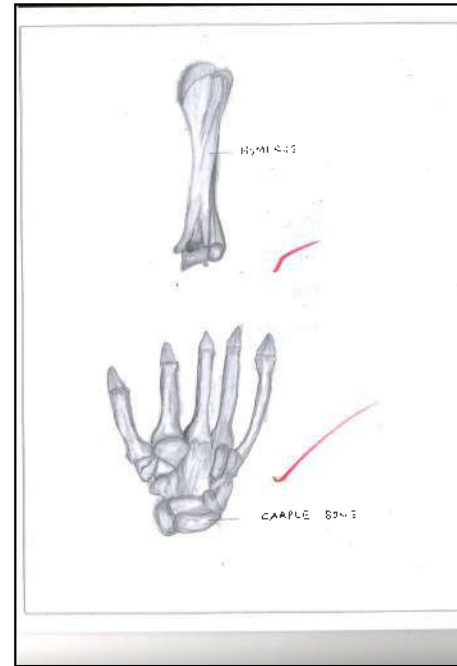
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## Four Types of bones

Bones are classified by their shape:

1. Long
2. Short
3. Flat
4. Irregular

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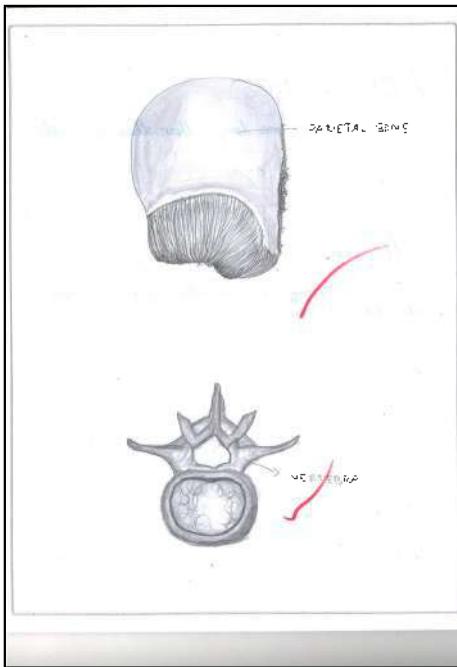
## Long bones

Bones are longer than they are wide  
(Arms, legs)

## Short bones

Bones are usually square in shape  
like (wrist, ankle)

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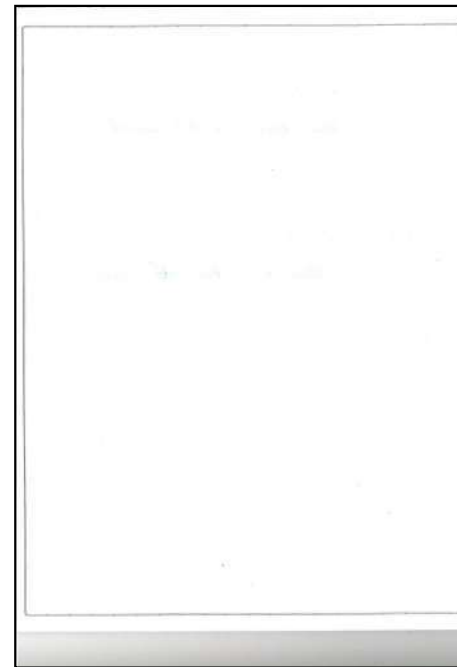
## Flat Bones

These bones are flat, curved (skull, sternum)

## Irregular bones

These bones have all shapes  
(vertebrae, pelvis)

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# MUSCLES OF UPPER BODY

Teacher's Signature \_\_\_\_\_

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## Muscles of the Upper Body

1. Biceps
2. Triceps
3. Deltoid
4. Pectoralis Major
5. Pectoralis Minor
6. Trapezius
7. Latisimus Dorsi
8. Rhomboid Major  
Rhomboid Minor
9. Serratus Anterior

Teacher's Signature \_\_\_\_\_

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## Biceps Brachii

Origin  
Short head: Tip of coracoid process of scapula.  
Long head: supraglenoid tubercle of scapula.

Insertion  
Tuberosity of radius and fascia of forearm.

Action  
Supinates forearm and, when it is supine, flexes forearm.

Teacher's Signature \_\_\_\_\_

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## Triceps

Origin  
Long head: infraglenoid tubercle of scapula.  
Lateral head: posterior surface of humerus, superior to radial groove.  
Medial head: posterior surface of humerus, inferior to radial groove.

Insertion  
Proximal end of olecranon process of ulna and fascia of forearm.

Action  
Chief extensor of forearm; long head steadies head of abducted humerus.

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## Deltoid

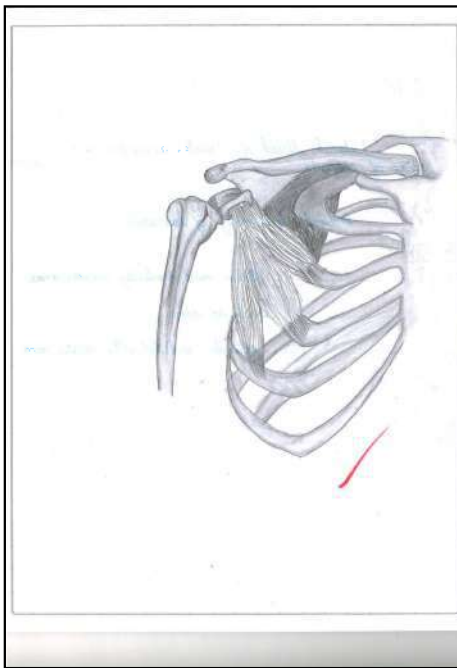
Origin  
Lateral third of clavicle, acromion, and spine of scapula.

Insertion  
Deltoid tuberosity of humerus.

Action  
Anterior part: flexes and medially rotates arm.  
Middle part: abducts arm.  
Posterior part: extends and laterally rotates arm.

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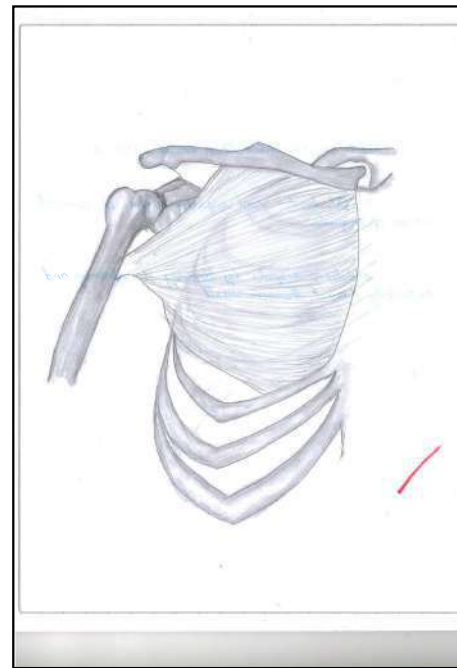
Pectoralis Minor

Origin 3rd to 5th ribs near their costal cartilages

Insertion Medial border and superior surface of coracoid process of scapula

Action stabilizes scapula by drawing it inferiorly and anteriorly against thoracic wall

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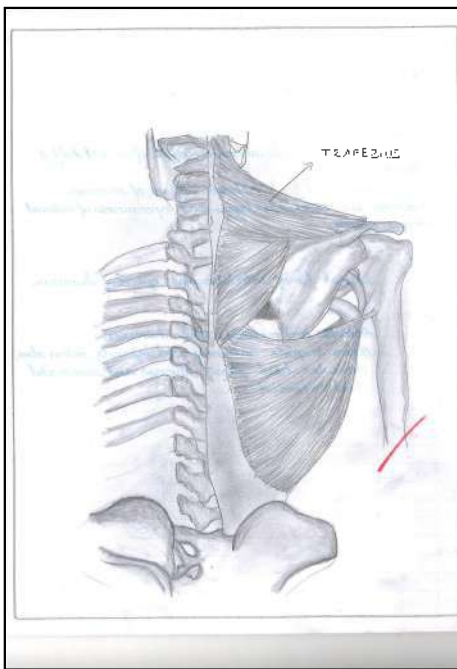
Pectoralis Major

Origin  
Clavicular head: anterior surface of medial half of clavicle  
Sternocostal head: anterior surface of sternum, superior six costal cartilages, and aponeurosis of external oblique muscle

Insertion Lateral lip of intertubercular groove of humerus

Action Adducts and medially rotates humerus; draws scapula anteriorly and inferiorly; action along clavicular head flexes humerus and sternocostal head extends it.

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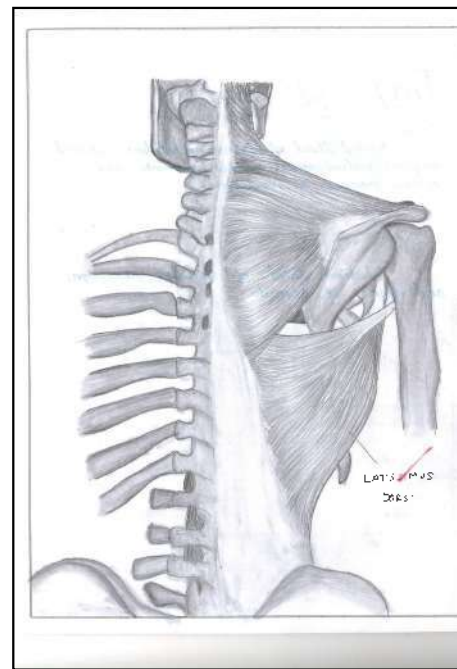
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Trapezius

Origin Medial third of superior nuchal line; external occipital protuberance; nuchal ligament; and spinous processes of vertebrae.

Insertion Lateral third of clavicle, acromion, and spine of scapula

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Latissimus Dorsi

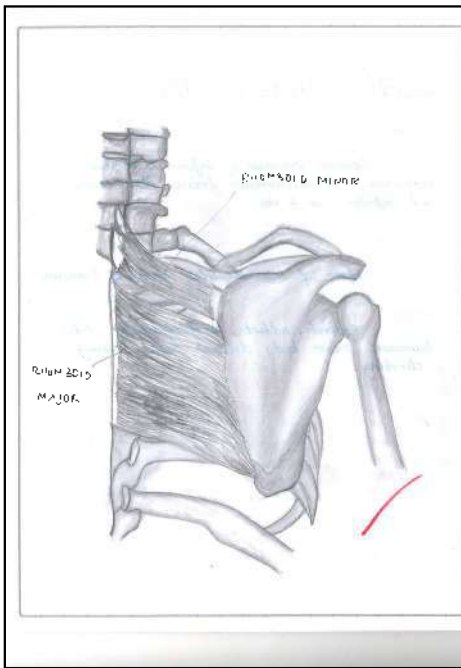
Origin  
 Spinous processes of inferior 6 thoracic vertebrae; thoracolumbar fascia; iliac crest; and inferior 3 or 4 ribs

Insertion Floor of intertubercular groove of humerus

Action Extends, adducts, and medially rotates humerus; raises body towards arms during climbing

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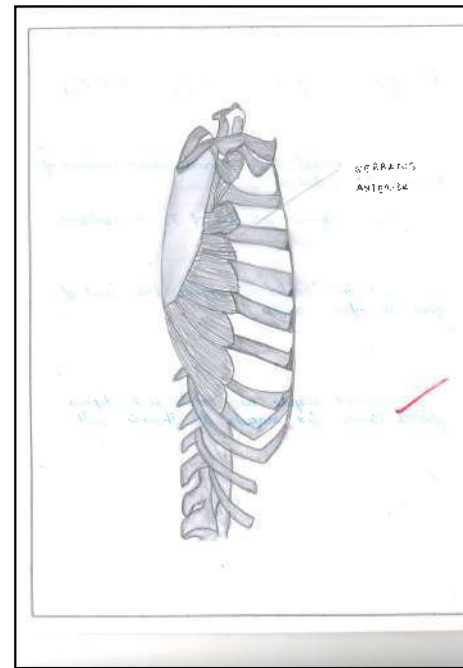
## Rhomboid Major & Minor

Origin  
 Minor: nuchal ligament and spinous process of C7 and T1 vertebrae  
 Major: Spinous process of T2 - T5 vertebrae

Insertion  
 Medial border of scapula from level of spine to inferior angle

Action  
 Retract scapula and rotate it to depress glenoid cavity; fix scapula to thoracic wall.

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## Serratus Anterior

Origin  
 upper 8 ribs and anterior intercostal membranes from midclavicular line. Lower four interdigitating with external oblique

Insertion  
 Inner medial border scapula (and 2: upper ribs; 3 and 4: length medial surface 5: inferior)

Action  
 lateral rotate and protract scapula

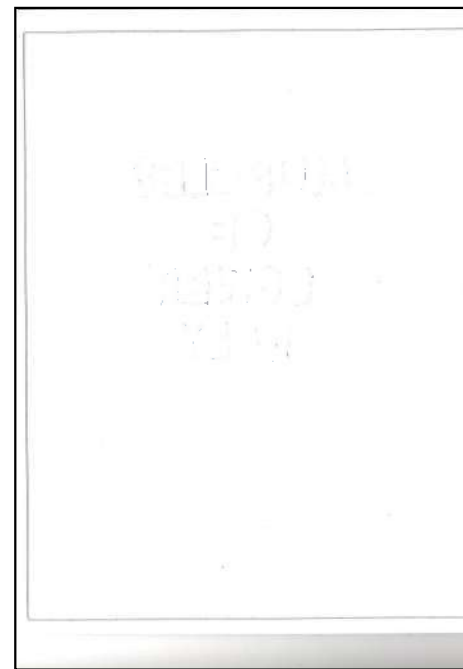
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# MUSCLES OF LOWER BODY

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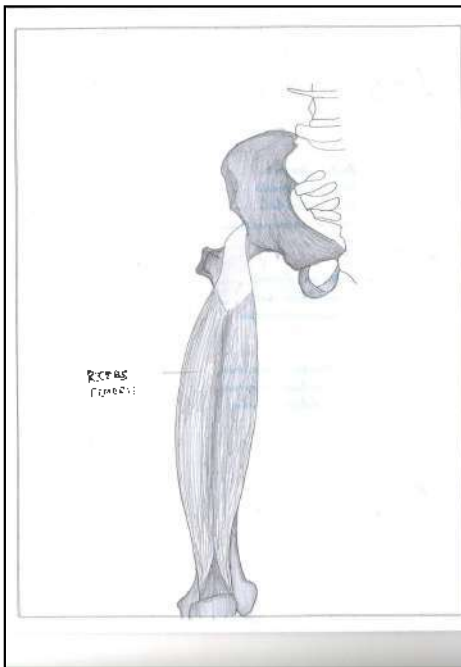


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## Lower Body Muscles

- 1) Quadriceps Group Of Muscles  
 Rectus femoris  
 vastus lateralis  
 vastus medialis  
 vastus intermedius
- 2) Sartorius Muscle
- 3) Hamstring Group Of Muscles  
 Biceps femoris  
 semitendinosus  
 semimembranosus
- 4) Calculus Group Of Muscles  
 Gluteus maximus  
 Gluteus minimus  
 Gluteus medius
- 5) Gastrocnemius Muscle:

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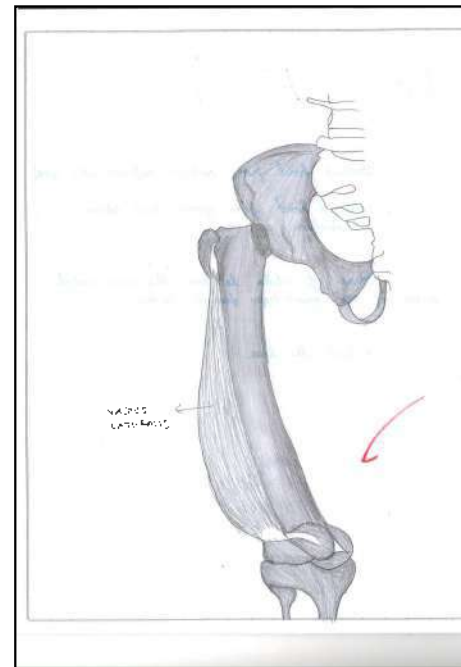
## Rectus Femoris

Origin: Straight head from anterior inferior iliac spine, reflected head from groove just above acetabulum.

Insertion: Base of patella to form the more central portion of the quadriceps femoris tendon.

Action: Extends the knee.

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## Vastus Lateralis

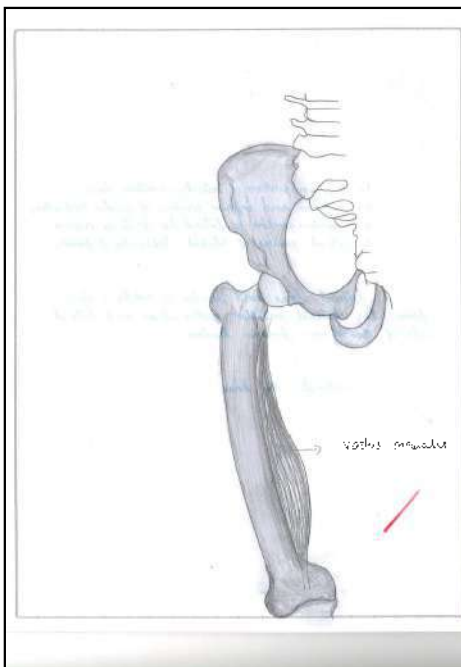
Origin:

1. Superior portion of intertrochanteric line.
2. Anterior and inferior borders of greater trochanter.
3. Superior portion of lateral lip of linea aspera.
4. Lateral portion of gluteal tuberosity of femur.

Insertion: Lateral base and border of patella; also forms the lateral patellar retinaculum and lateral side of quadriceps femoris tendon.

Action: Extends the knee.

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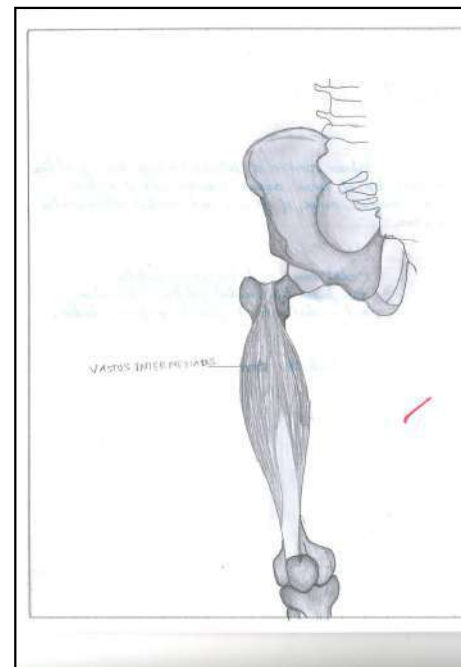
## Vastus Medialis

Origin: Inferior portion of intertrochanteric line, spiral line, medial lip of linea aspera, superior part of medial supracondylar ridge of femur, and medial intermuscular septum.

Insertion: Medial base and border of patella; also forms the medial patellar retinaculum and medial side of quadriceps femoris tendon.

Action: Extends the knee.

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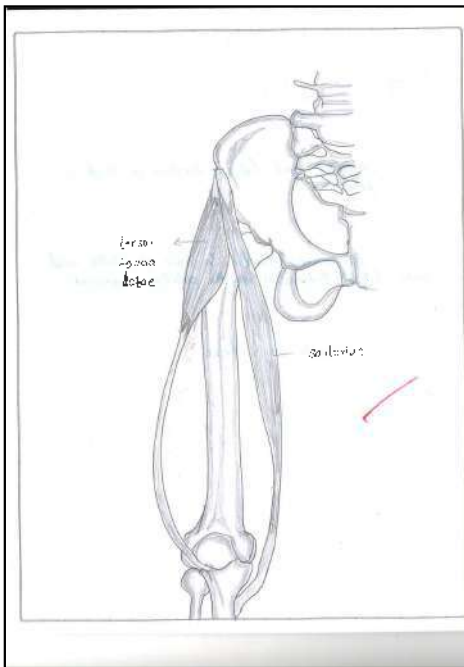
## Vastus Intermedius

Origin: Anterior and lateral surface of shaft of femur.

Insertion: Quadriceps tendon to base of patella and onto tibial tuberosity via the patellar ligament.

Action: Extends the knee.

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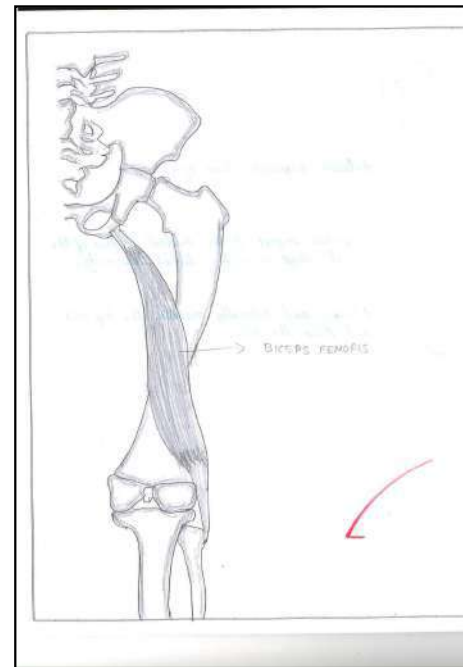
## Sartorius

Origin: Anterior superior iliac spine.

Insertion: Superior aspect of the medial surface of the tibial shaft near the tibial tuberosity.

Action: Flexes and laterally rotates the hip joint and flexes the knee.

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## Biceps Femoris

Origin: Long head from common tendon with Semitendinosus from superior medial quadrant of the posterior portion of the ischial tuberosity. Short head from lateral lip linea aspera, lateral supracondylar ridge of femur, and lateral intermuscular septum of thigh.

Long head  
Insertion: Primarily on fibular head, also on lateral collateral ligament and lateral tibial condyle.

Action: Flexes the knee, and also rotates the tibia laterally; long head also extends the hip joint.

Short head  
Insertion: Primarily on fibular head; also on lateral collateral ligament and lateral tibial condyle.

Action: Flexes the knee, and also rotates the tibia laterally; long head also extends the hip joint.

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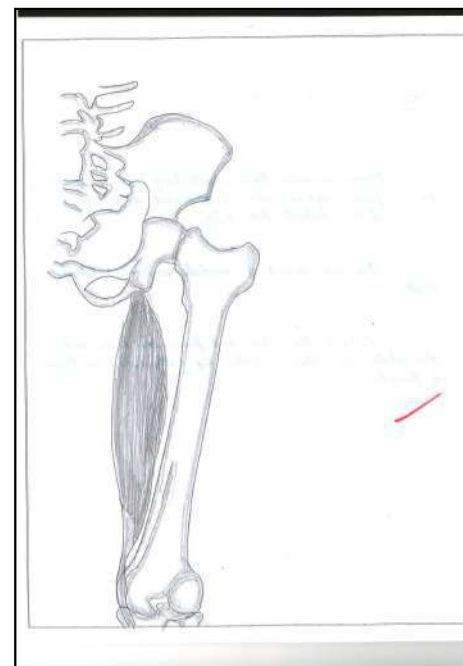
## Semitendinosus

Origin: From common tendon with long head of biceps femoris from superior medial quadrant of the posterior portion of the ischial tuberosity.

Insertion: Superior aspect of medial portion of tibial shaft.

Action: Extends the thigh and flexes the knee, and also rotates the tibia medially, especially when the knee is flexed.

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## Semimembranosus

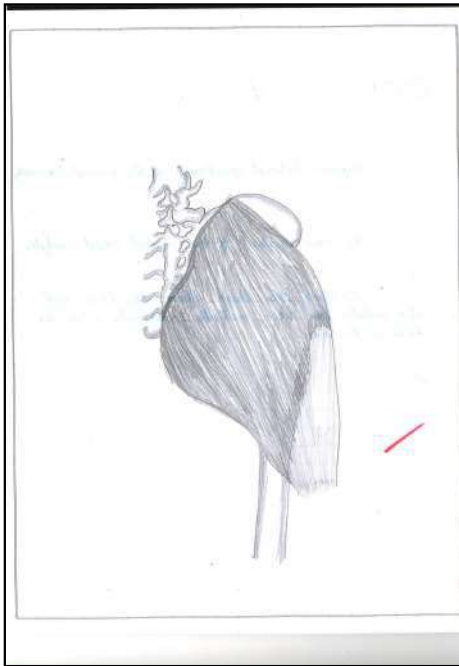
Origin: Superior lateral quadrant of the ischial tuberosity.

Insertion: Posterior surface of the medial tibial condyle.

Action: Extends the thigh, flexes the knee, and also rotates the tibia medially, especially when the knee is flexed.

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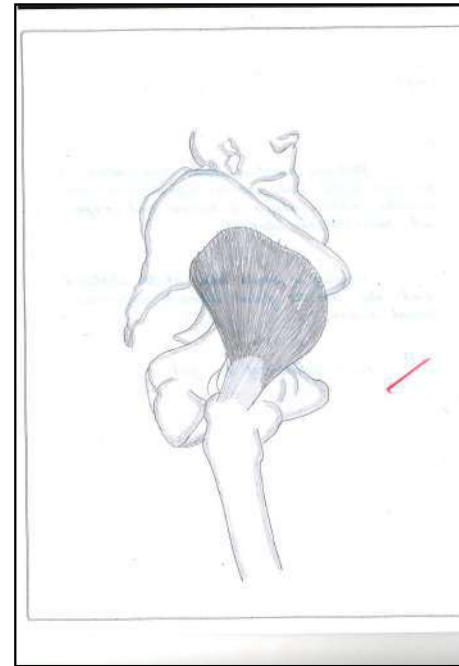
## Gluteus Maximus

Origin: posterior aspect of dorsal ilium posterior to posterior gluteal line, posterior superior iliac crest, posterior inferior aspect of sacrum and coccyx, and sacrotuberous ligament.

Insertion: primary in fascia lata at the iliotibial band; also into the gluteal tuberosity on posterior femoral surface.

Action: Major extensor of hip joint.

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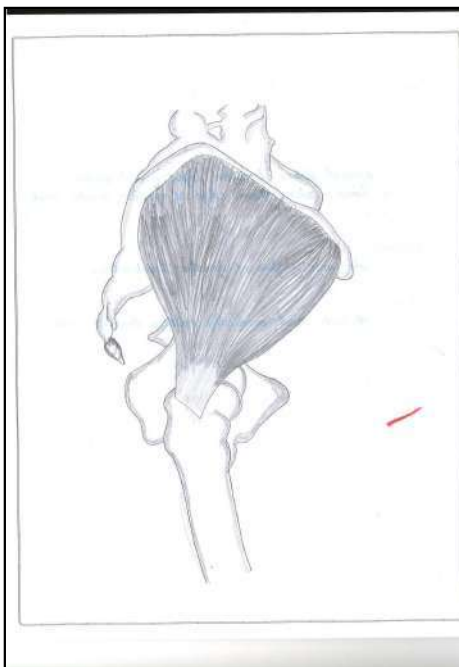
## Gluteus Minimus

Origin: dorsal ilium between superior and anterior gluteal lines, also from edge of greater sciatic foramen.

Insertion: Anterior surface of greater trochanter.

Action: Abducts and medially rotates the hip joint.

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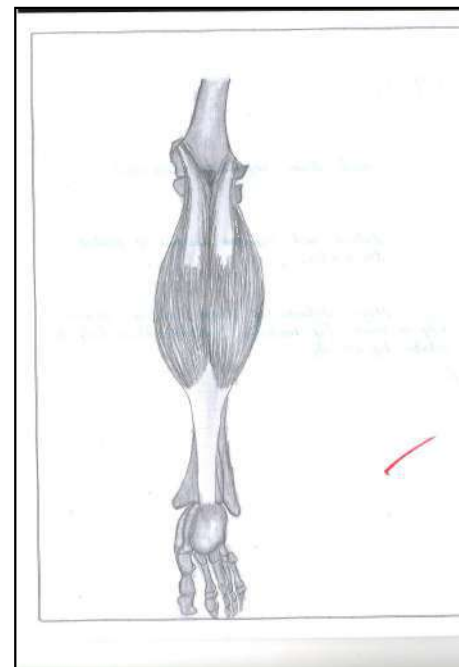
## Gluteus Medius

Origin: Dorsal ilium superior to iliac crest.

Insertion: Lateral and superior surface of greater trochanter.

Action: Major abductor of thigh; anterior fibers help to rotate hip medially; posterior fibers help to rotate hip laterally.

Teacher's Signature \_\_\_\_\_



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## Gastrocnemius

Origin: medial head from posterior nonarticular surface of medial femoral condyle; Lateral head from lateral surface of femoral lateral condyle.

Insertion: The two heads unite into a broad aponeurosis which eventually unites with the deep tendon of the soleus to form the Achilles tendon, inserting on the middle 1/3 of the posterior calcaneal surface.

Action: powerful plantar flexor of ankle.

Teacher's Signature \_\_\_\_\_

## Sports organisations in Indian sports.

1. Indian Olympic Association (IOA)
2. All India Football Federation (AIFF)
3. All India Tennis Association (AITA)
4. All India Chess Federation.
5. Board of Control for Cricket in India (BCCI)
6. Athletics Federation of India (AFI)
7. Badminton Club of India (BCI)
8. All India Carrom Federation (AICF)
9. Badminton Association of India
10. Bridge Federation of India
11. Carrom Federation of India (CFI)
12. Cycling Federation of India
13. Equestrian Federation of India (EFI)
14. Hockey India
15. Indian Mountaineering Foundation (IMF)
16. Indian Parachuting Federation.
17. Indian Triathlon Federation (ITF)
18. Professional Golf Tour of India
19. Squash Rackets Federation of India (SRFI)
20. Table Tennis Federation of India (TTFI)
21. The Federation of Motor Sports Clubs of India (FMSCI)

22. The Indian Badminton Union.

23. Table Tennis Federation of India (TTFI)

24. Volleyball Federation of India

25. Yachting Association of India (YAI)

26. Handball Federation of India (HFI)

27. Throwball Federation of India (TFI)

28. The Amateur Kabaddi Federation of India

29. Archery Association of India (AAAI)

30. All India Wrestling Association.

31. Sports Authority of India (SAI)

## SPORTS AUTHORITY OF INDIA (SAI)

The Sports Authority of India (SAI), a successor organisation of the IX Asian Games held in New Delhi in 1982, was set up as a society registered under the registration of societies Act, 1860, in accordance with the Resolution No. 1-1/82-SAI dated 23-01-1982 by Department of Sports, Govt. of India. It was established with the objective of promotion of games and sports in the country. It was also assigned the responsibility of maintaining and utilising the existing stadiums in Delhi which were constructed (renovated during the IX Asian Games). Subsequently, in order to adopt an integrated approach toward promotion and development of sports activities, Secretary for National Institutes of Physical Education and Sports (SNIPES) was merged with SAI w.e.f. May, 1984.

SAI is an apex body for promotion of sports in the country. The General Body, being headed by successive Prime Ministers as its President. The Governing Body of SAI is headed by the Union Minister for Human Resource Development and has Union Minister of State for Youth Affairs and Sports as its vice chair person. As per the SAI Rules the General Body should generally meet annually whereas the governing body should ordinarily meet at least once in each quarter of the financial year.

Secretary SAI is the member Secretary of the General Body and the governing body. In the year 1984 the General Body and governing body of SAI was reconstituted by the Department of Youth Affairs and Sports, Ministry of Human Resource Development, Govt. of India. Unlike in the past Hon'ble Prime Minister is now the ex-officio President of the General Body of SAI.

Composition of the General Body and the Governing Body:

The General Body has 27 members out of which 16 are ex-officio members and 11 are non-officio members who are nominated by the Govt. of India under different ministries.

Governing Body: Governing Body has 28 members out of which 16 are nominated by the Govt. of India and the remaining 12 are ex-officio members.

Regional centres of SAI:

The Sports Authority of India has six regional centres with Headquarters at Bangalore (Southern Centre), Calcutta (Eastern Centre), Chandigarh (Northern Centre), Delhi (Central Centre), Guwahati (North Eastern Centre) and Imphal (North Western Centre).





### Different types of Bulletins:

- 1) Five minutes bulletin.
- 2) Ten minutes bulletin.
- 3) Fifteen minutes bulletin.
- 4) 150 hourly bulletin.
- 5) 1200 " "
- 6) 1300 " "
- 7) Hourly " "
- 8) Special " "
- 9) Daily " "
- 10) weekly " "
- 11) Fort nightly " "
- 12) Monthly " "
- 13) B. Annual " "
- 14) Annual " "
- 15) Radio " "
- 16) Television " "
- 17) Air " "

3. For a 5 min bulletin done from the pool items the time must be a hour before the schedule of going on the air and another half an hour in the editor is relying on the sources.

4. Studying the material that is already available. The previous pools, day pool and B and both the morning pools.

5. along with the previous bulletins of the cycle, would constitute the material.

6. In the other case, the editor has to study not only the previous bulletins of series but also the agency copy.

7. Reporter's copy and monitoring reports received since the last bulletin went on the air.

1. In the previous two chapters we saw how a bulletin is structured and the drill you have to follow in compiling a bulletin.

2. we took the ten minute bulletin as a standard radio news bulletin and its features and the features of fifteen min bulletin.

3. we also discussed a five min bulletin briefly.

4. Some of these bulletins, for audiences speaking the various Indian languages, are clubbed together, and a common English script is compiled in the GNR.

### Compiling Bulletin:

1. For ten min bulletin the editor must begin this work atleast 2 1/2 hrs before the time of broadcast.

2. If you are doing one of the 15 min bulletins the work must begin 3 1/2 hrs PRIOR to the broadcast.

### The structure of bulletins:

1. A number of items put together makes a news bulletin but a bulletin is not just a string of individual news items brood cat at the scheduled time the bulletin is.

2. More than a sum total of a number of stories the bulletin is a collective form in which the separate news items are brought into a coherent order and some relationship.

3. Headlines also referred to as the main points.

4. The body of the bulletin which consists of different news items.

5. The head lines being repeated at the end of the bulletin after which comes the closing announcement.

6. That is the end of the news or that is the end of this bulletin the announcer or the station then says in and tells you.

7. headline should be crisp short and must not carry too many details at the same time the head line must not vague.

SEM III  
 PACE 302 - SCIENTIFIC PRINCIPLES OF SPORTS TRAINING

TOPIC - MOTOR COMPONENTS  
 MEANS AND METHOD OR TRAINING

MOTOR COMPONENTS

- Agility ✓
- Coordination ✓
- Speed ✓
- Power ✓
- Balance ✓
- Reaction Time ✓
- Strength ✓

MEANS AND METHODS OF TRAINING THEM

① AGILITY

The ability to change direction and accelerate into in motion. And to use these phases, accurate, sensitive and consistent.

They can be trained or improved through -

- Lateral Plyometric Jumps - help build explosive power, balance and coordination by using lateral body weight
- Forward Running High-knee Drills - improve foot coordination and speed for all field sport athletes
- Lateral Running Drills - for side steps - improve knee and ankle sensitivity, making them ideal for court sports

- Net Drills - agility and explosive speed and sustainable when one has appropriate leg strength.
- Jump Box Drills - great for quadriceps, glutes and hamstring muscles
- L Drills - to develop rapid change of direction ability and speed (lower drills)
- Shuttle Run - easy way to inject some high intensity training into a basic conditioning program, which builds speed, agility and endurance.

② COORDINATION

The ability to select the right muscle at the right time with proper intensity to achieve proper action. It utilizes an area of the brain known as cerebellum. They can be trained through -

- Jumping rope
- Juggling
- Basketball
- Biking

③ SPEED

The ability to move all or part of the body as quickly as possible.

They can be trained through -

- 100m Sprint - upper sprint at an all-out speed for 10 to 20 meters.
- Lateral Run - use 100m HST workouts, one wears at high intensity for a short period of time, recovery and repetition
- Box Drills - to improve speed and fitness
- Long Slow Run - builds aerobic capacity, which helps improve speed during shorter sprints
- Running workout, strength exercise and agility exercise

④ POWER

The amount of energy transferred or converted per unit time.

They can be trained through -

- Burpee to Box Jump - 15 sets of three sets, rest 45 seconds
- Back Squat - 5 sets of 5 reps with a pause, rest 3 minutes
- Squat High Pull - 3 sets of 3 reps, rest 2 minutes

⑤ BALANCE

to be stay upright or stay in control of body movement. Improved balance and muscle group coordination will naturally improve body's ability to control itself during challenging tasks.

It can be improved through -

- Single leg stance
- Squats
- Tandem Walking (walking down line on straight, heel to toe)
- Amputation with high knees
- Stairclimbing
- Use of Balance Pad, ball and beam.

⑥ REACTION TIME

is an interval between an athlete or a ball being, seeing their opponent's move and responding to it (after).

It can be trained through -

- Cognitive training exercise
- Visual Drill
- Ball Drops Drill
- Reactive Sprint and Backpedal Drill
- Reaction Cone Drill

⑦ STRENGTH

The ability to exert force to overcome resistance.

It can be trained through -

- Resistance band exercise
- Squats
- Hip Thrusts
- Chest Press
- Weightlifting
- Bodyweight exercise

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SEM II  
SPORTS NUTRITION & HEALTH PROMOTION  
UNIT IV - INJURY PREVENTION  
CIGARETTE SMOKING  
RISK FACTORS  
METHODS TO STOP SMOKING  
EXERCISE  
DIET

Smoking can cause lung disease by damaging your airways and the small air sacs (alveoli) found in your lungs. Lung diseases caused by smoking include COPD, which includes emphysema and chronic bronchitis, lung cancer.

A cigarette is a narrow cylinder containing combustible material, typically tobacco, that is rolled into thin paper for smoking.

Why Cigarette? ... Nicotine and other chemicals in tobacco smoke are easily absorbed into the blood through the lungs. From there, nicotine quickly spreads throughout the body. When taken in small amounts, nicotine causes pleasant feelings and distracts the user from unpleasant feelings. This makes the tobacco user want to use more.

- RISK FACTORS -**
- Smoking damages the heart and blood circulation, increasing risk of developing conditions:
    - Coronary heart disease
    - Heart attack
    - Stroke
  - Chemicals like nicotine, carbon monoxide, tar, benzene, arsenic and formaldehyde found in cigarettes, causes:
    - Cardiovascular disease
    - Cancer (lung): death
    - Chronic lung disease
    - Hypertension

- COPD (Chronic obstructive pulmonary disease), an obstructive lung disease that makes it hard to breathe
- Asthma
- Reproductive Effects in Women
- Premature, low birth-weight babies
- Blindness, cataracts and Age-Related Macular Degeneration
- Cancer -
  - Colon
  - Cervix
  - Liver
  - Stomach
  - Pancreatic

- METHODS TO STOP SMOKING -**
- Nicotine replacement therapy:
    - Good way of nicotine replacement therapy as nicotine gum, patches, nasal spray or inhalers - can help ease nicotine cravings. Prescription patches in a small spray or inhaler form - can reduce nicotine pleasure.
    - Prescription non-nicotine stop-smoking medications such as bupropion (Zyban) and varenicline (Champix)

- Avoid triggers - Identify your trigger situations and have a plan in place to avoid them entirely or get through them without using tobacco.
- Delay - Do something to distract yourself. Try going to a public place - just some basic simple things may be enough to distract your tobacco craving.
- Chew on it - Chew on sugarless gum or fruit candy, or march in place, count, calisthenics or deep breathing exercises - something coming to smoking, to fight a tobacco craving.
- Don't have just one - Never just yourself into believing that you can stop with "just one".
- Physical Activity - Can help ease distress from tobacco cravings and reduce those cravings. Even short bursts of physical activity - can make a tobacco craving go away.
- Positive relaxation techniques - Smoking may have been your way to deal with stress. Practice deep-breathing exercises, muscle relaxation, yoga, massage or listening to relaxing music.

- Call for reinforcements - Touch base with a family member, friend or support group member for help to ease effort to resist a tobacco craving.
- Go online/offline for support - Join stop-smoking program/therapist or read a quack's blog and post encouraging messages for someone else who might be struggling with tobacco cravings.
- Reward yourself of new habits - Write down or say out loud the reasons you want to stop smoking and resist tobacco cravings.

**EXERCISE**

Withdrawal symptoms and cravings for cigarettes decrease during exercise and up to 30 minutes after exercising. Exercise decreases appetite and helps with weight gain. Some people have when they quit smoking. Even moderate intensity exercise reduces the severity of nicotine withdrawal symptoms. Some are as follows -

- Walking, swimming, dancing, jogging, cycling, and boxing are a few types of aerobic exercise.
- Jogging, walking, strength training
- Endurance (slow) exercise

Exercise increases one's body's metabolism rate, leading to burning of nicotine faster, reducing their

- DIET**
- Food and drinks that could help smokers quit -
- Fruits & vegetables - Cigarettes block the absorption of important nutrients, such as calcium and vitamin C and D.
  - Green Tea
  - Milk & dairy
  - Sugar-free gum and mints
  - Vitamin B12 - abundant in yogurt and other healthy dairy products.
  - B6 (fish, meat, potatoes, whole grains)
  - B9 C (fruits & green leafy vegetables, dried beans, lentils, broccoli)
  - Dry fruits, oranges, spinach, berries, carrot juice
  - Vitamin C, B6, B12, A1 - bananas & potassium & magnesium which assist the body to cope and deal with the effects of quit smoking.
  - Fenugreek (it is curcumin)
  - Salt (it is a bit of a placebo but it's good to help us some respiratory infections that clog our lungs & leads to bronchitis and congestion)