CHAPTER I

INTRODUCTION

Among the living organisms, human being is considered as the supreme creation in the world. It is because human being only has the potential skills such as thinking and intellectual ability. The Tamil Sangam poetess **Avvaiyar** speaks about the greatness of human being with her phase "born as a human being is a rarity that to getting a birth without any problems such as handicapped, blind, deaf and dumb on transgender is the rarest of the rarity. Such a rare group shines well with survival skills such as education and experience. So, getting a birth of human being and enriching with education are being considered as a boon in the world. So, most of the Government in the world spend covetable amount of money to educate the children of their country. In general, education is considered as a tool for bread and butter purpose but it provides scope for all strata of society to uplift their life style.

In the brim of 20^{th} century, our society has been facing and reporting the issues related to the special children such as physically handicapped, visually challenged, hearing impaired, deaf and dumb, and learning difficulty such as Dyslexia. The type of education designed for these people is called 'Special Education'. Tamil Nadu Government created a Ministry for Differently Abled people (**Mattruththiranaligal in Tamil**) exclusively for these children. They should try their level best to utilize these facilities to share all opportunities made available for their normal counterparts.

1.1. OVERALL PERCENTAGE

The issue of special need people has got a considerable attention in recent years, globally and locally, where **Al-Rousan (2007)** pointed that the

disability has negative repercussions on the disabled person personality and counter effect on the community. The disabled person is considered as an economical burden on his family and community. The duty of the society is to interact positively with various categories of disability on solid foundations and constructive objectives and help in the development of disabled persons and reflect his improvement in all physical, psychological, mental and social well-being, as well as to produce a personality capable of adapting to the surrounding community standards.

Alqoraity (2001) mentioned that the deafness disability has a particular importance because of the importance of the sense of hearing to the individuals and the problems caused by losing it. The result of losing the basic means of communication among the members of the community leads to great loss for the individuals. **Rateb (2007)** said that the proportion of people who suffer from weak to full hearing loss reached between 4 to 5% of individuals worldwide. This deficit does not mean that disabled hearing person has lost his ability to work and satisfy his psychological and physical needs, but by training and care, he can perform a high level of performance and achievement in various fields.

1.2. CAPACITY OF HEARING DISABLED

Alkrioti (1995) insisted that the hearing-disabled are capable of performing most if not all activities that suit other ordinary people with the same orientation and mental level. It also stresses by **Canon (2002)** that the hearing-disabled have super power in game, play and physical achievement of some motor skills more than their ordinary peers, as they are distinguished from all other disabilities, that their organs are sound and their senses are correct, and will enjoy high fitness with the regular training, if they were guided correctly to reach a level

similar to the level of ordinary peers with similar orientation and mental level. That is why the psychological factors are considered an important element of success in all games and sports events, where **Allawi (1992)** pointed that when the Supreme sports level players are similar in physical aspects, skills, and planning, the psychological factor is that which determines the result of competition. One of the important psychological factors in progressing and achieving are motivation, anxiety and tension, and thus by knowing the level of these features, one can answer some important questions concerning the deaf exercising a certain sports activities, or their reluctance about playing with fellow peers and their participation in their activities.

Based on the foregoing researchers who try to identify the motivations of worry and anxiety among deaf players and specifically in the skills of aiming in the game of basketball in Jordan, because of its importance at all levels. It was seen that concern and tension in the area of sports for the deaf, and their achievements and behaviors reflecting all aspects of personality, and these sports accomplishments for hearing handicapped, is not dependent only on the physical and skillful evolution but also influenced by many psychological factors such as their motivations, desires, satisfactions, cognition, psychological preparedness, thinking, fear and anxiety ... etc, It was observed that the feel roundness and happiness of the deaf player when succeed, and his disappointment and despair when he fails, affect his performance efforts strongly.

The deaf player can be encouraged or discouraged, he could be tired on sometimes paralyzed, he might get initially fever symptoms or indifference. It is a double-edged sword to engage them in sports.

1.3. EDUCATIONAL METHODS

Afifi (1998) pointed that there are a lot of educational methods in the teaching of deaf players the basic skills in games, and till used as the percentage of success varied in their skill and physical performance, and in this regard **Mahrous (2000)** recalls that the basketball game contains basic offensive and defensive skills that makes the team win, if it is performed nicely and quickly, basic skills are necessary to raise the level of the group towards excellence, any player should master the basic skills, since there are no skill that are more important than others, as it is the movements that each player should be implemented in accordance with the conditions required by the game, in order to reach positive results and saving effort and delay case of fatigue.

Ammons (2008) deaf people, since time immemorial, have always found a way to find each other and share their commonality and, in particular, their need for visual communication through sign language. Since the first schools for the Deaf were established in **Paris, 1755,** deaf people began congregating in more formal situations, primarily for social and cultural reasons. Most Deaf people are (and still are) born into hearing families.

They have experienced difficulties with communication and especially the misunderstanding of how Deafness affects the ability to participate in society. This, in turn, has led to negative stereotypical attitudes towards them. A classic example is the term “Deaf and dumb” which describes Deaf people as “dumb”, “stupid” or “incompetent.” Societies everywhere have viewed Deaf people as intellectually inferior, linguistically impoverished and often have been treated as marginalized citizens.

The first Games, known as the International Silent Games, were held in Paris in1924. The Silent Games were the first ever sports event for any group of people with disabilities. In deaf Olympics, athletes competed in fifteen (15) different sports competitions including swimming, athletics, tennis, ten-pin bowling, basketball, indoor volleyball, beach volleyball, table tennis, handball, wrestling, cycling, football, orienteering, shooting and badminton. Assistive visual devices were used in swimming, water polo, athletics, shooting and basketball. These devices were flashing lights that replaced the starter's gun or referee's whistle (**Ammons, 2008**).

1.4. VIBRATOR TRAINING

All information about the world is perceived by human through five senses: sight, hearing, touch, smell, and taste. Tactile perception is associated with the sense of touch. Touch is perceived through the skin which contains receptors for pressure, pain, temperature, and kinetic receptors. The band width for each sense, the rate at which the brain can process information from the sensory receptors, is largest for sight and decreases rapidly for each sense in an order of vision 106 bits/s, hearing 104 bits/s, touches 102 bits/s (**Goldishand and Taylor, 1974)**.

Human brain receives and understands vibration stimuli. Vibrotactile sensation generally means the stimulation of skin surface at certain frequency using vibrating contactors. Pacinian Corpuscles are considered performing a major role in vibrotactile perception with maximum sensitivity at higher frequencies, i.e., 200−300 Hz. The phenomenon of vibrotactile sensation was first introduced by **Geldard, 1960**.

There are four different parameters through which vibrotactile information coding can be studied, namely, frequency, amplitude, timing and location. A vibrotactile stimulus is only detected when the amplitude exceeds a certain threshold, known as detection threshold (DT). In general, DT depends on several different parameters (**Van-Doren (1990**) but mainly on the frequency (~20-500 Hz) and location (fingers are most sensitive 250-300 Hz). Vibrating stimulus up to 200 Hz results in synchronized firing of afferent nerve fibers and considered capable of great physiological information flow, i.e., due to presence of large number of mechanoreceptor esp. PC's (**Kaczmarek and Rita, 1995**). By using single detectable stimulus simple messages can be encoded **Rehman, et al., (2008**). **Van Erp, et al., (2006)** has given detailed information for the use of vibrotactile displays in human computer interaction.

While presenting tactile coding information, a designer should consider the following principals (**Kaaresoja and Linjama, 2005**). No more than four intensity (magnitude) levels should be used. No more than nine frequency levels should be used for coding information and the difference between adjacent levels should be at least 20%. The time interval between adjacent signals should be more than 10 milli-seconds to prevent the "saltation effect". The vibration on the hand should be carefully dealt with and long durations might make users irritated. Vibration intensity can be used to control threshold detection and sensory irritation problem; similar to volume control in audio stimuli (**Rehman, 2010**).

Vibration offers many potential benefits for the use of mobile phones. A mobile phone is "synchronized" with the ball in the real field. By holding the phone, users are able to experience dynamic movements of the ball, to know attacking

directions and which team is leading the attack. The usability test of the system shows that vibrotactile display is suitable for rendering live football information on mobile phones by adopting designed coding schemes with a right training process (**Rehman, et al., 2008**).

Sport technologies use embedded and wearable sensors for measuring physiological aspects and muscle movements that can help coaches understand and improve the performance of athletes. **Chi, et al., (2005)** described that these technologies could help to improve sports performance and learning, to encourage more exercises, and to make sports more entertaining. Besides assisting coaches, sport technologies could also support athletes with real-time instructions on how to move the body or with immediate feedback on their performance. This information could be presented as artificial tactile stimuli, as sound, or visually on a display.

For acquiring motor skills, such as in sports training, it is important that the learner frequently receives instructions on how to perform the skill and feedback on the performance. Coaches typically give instructions and feedback before and after a trial, and concurrently during the execution of the movements. Yet in many sports, the coach cannot correct the learner during an exercise. A good case in point is snowboarding. Snowboarders receive instructions before descending the slope and delayed feedback after the ride. During the ride, they are spatially separated from their coach. They have to rely on their own perception of what is right or wrong (**Van, et al., 2006**).

For instructing snowboarders during the ride, the coach could descend alongside the student to call out instructions. Even so, snowboarders could miss

these spoken messages in the noisy environment. Spoken messages could also block environmental audio cues on which snowboarders rely on. Artificial tactile stimuli are an alternative means to give real-time instructions or feedback without these drawbacks. These stimuli can be generated by actuators, such as vibration motors that are sewn into the sportswear.

Tactile stimuli have been proposed as application in sports for instructing athletes where to move to, how to move, and when to move (**Van, et al., 2006**). Their advantage is that they directly stimulate the body, like a coach who guides the student's movements. When the athlete needs only a hint at how to adjust the posture, a tactile stimulus can nudge the body in the right direction. **Van Erp, et al., (2006)** described that tactile stimuli could signal to athletes where to move to, how to move and when to move. **Van Erp, et al., (2006)** also reported that the first two application scenarios where and how to move—were tested with elite athletes in soccer training, cycling, and speed skating.

Furthermore, **Van Erp, et al., (2006)**, conducted a laboratory study where rowers received tactile instructions when to move the legs and the back while exercising with a rowing machine. The findings of their study indicated that tactile instructions can help athletes maintain a high performance level. Several studies suggest that tactile instructions can support the learner in acquiring motor skills.

Bloomfield and Badler (2008) reported that tactile stimuli at the arm help novices learn karate arm movements in a virtual reality setup. **Nakamura, et al., (2005)** applied tactile stimuli at the wrist to instruct dance beginners when to perform a movement. In general, the participants were able to increase the number

of correct movements and to perform these movements faster compared to dancing without tactile cues. Tactile stimuli were also shown to be effective for learning to play musical instruments. For example, **Holland, et al., (2010)** used tactile stimuli at the wrists and ankles for teaching drum patterns. **Huang, et al., (2010)** used tactile stimuli at the fingers for teaching piano melodies.

Besides instructing when and how to perform a movement, a tactile stimulus can also act as feedback when the movement is wrong. In general, feedback does not instruct the learner how to perform a movement but it can implicitly indicate the direction to move in order to correct the error. For example, **Lieberman, et al., (2007)**, asked participants to mimic an arm movement that was shown on a computer display.

A motion capture system tracked and analyzed the performed movements. Real-time tactile feedback at the arm represented the deviations from the target movements. This feedback resembled a force-field around the correct movement path and indicated the intended movement direction. According to the findings of their laboratory study, **Lieberman, et al., (2007)** reported that the addition of tactile feedback to motor training could improve performance and could support learning.

The findings of several studies indicate that artificial tactile stimuli could be beneficial for learning motor skills, such as dancing (**Nakamura, et al., 2005**), rowing (**Van, et al., 2006**), and karate moves (**Bloomfield and Badler, 2008**). There is also evidence that tactile stimuli can facilitate the learning of musical instruments (**Holland, et al., 2010 and Huang, et al., 2010**). Even so, the work (**Nakamura, et**

al., 2005, Van, et al., 2006 and Bloomfield and Badler, 2008) did not consider realistic training scenarios but focused on laboratory settings, nor did it focus on sports training (**Holland, et al., 2010 and Huang, et al., 2010**). To better understand the potential and pitfalls of using tactile stimuli for teaching sport skills, it is important to consider a broad range of physical activities, user groups, learning conditions, and real-world scenarios.

1.5. SOCCER REFEREE'S VIBRATOR EQUIPMENTS

In association football, the referee is the person responsible for enforcing the Laws of the Game during the course of a match. Referee is the final decision-making authority on all facts connected with play, and is the only official on the pitch with the authority to start and stop play and impose disciplinary action against players during a match. At most levels of play the referee is assisted by two assistant referees (formerly known as linesmen), who are empowered to advise the referee in certain situations such as the ball leaving play or infringements of the Laws of the game occurring out of the view of the referee. (***https://en.wikipedia.org/wiki/Referee_(association_football***). Soccer referee's equipments are whistle, timepiece, yellow, red card, notebook, Assistant referee's flag, Pressure gauge, Electronic boards, vanishing spray and Transmitter. Among these instruments as far as our study is concerned transmitter is taken into account. The transmitter is a common equipment for referees in top-flight leagues and international competitions. It is a radio-like device used by the officials to communicate with each other during a game. The transmitter is typically made of a body, which is worn at the waist, and a mouthpiece and earphone (***http://www.football-bible.com/soccer-info/soccer-referee-equipment.html).*** The assistant referee's carried an electronic flag that was

connected with the vibrator which was fixed in referee's arm. When the assistant referee switched on the button, referee would feel vibration on his arm and assistant referee communicated with referees in the line for the foul, offside or any other incident (***http://www.goalnepal.com/news.php?id=13876***)**.**

Harold (2005) in his invention relates to a system of devices that can be integrated into elements that are designed to assist the referee in football, such as the referee's whistle, the linesmen's flags, the playing area and the ball. The inventive system can also be used for American football and for any other ball sports. The invention makes use of a series of sensor elements, LEDs (light-emitting diodes) or indicator bulbs, vibration indicators, a control console, a laser light and radiofrequency signal transmitter/receiver mechanisms together with the respective microchips thereof, all of which are known in electronics. The aforementioned elements are adapted and used as auxiliary refereeing supports in the standard elements, i.e. the whistle, flags and rectangular playing area, and, in this way, can be used to provide instant correct solutions to playing situations that could give rise to dubious decisions and subsequent disputes.

1.6. SIGN LANGUAGE

Sign language refers to the indigenous language used by the deaf group in a country. Every country has a sign language of its own, which has developed spontaneously within the deaf group of that country. In an effort to improve deaf people's living conditions, the removal of communication barriers is of paramount importance. A deaf person must have the right to use sign language as his natural language in any social situation. The status of sign language must be raised to that of

a scheduled language in India. This is the primary need of the deaf community in India today (**Indian Sign Language Dictionary**).

Signs can be decomposed into a set of minimal, meaningless units, including the features of hand configuration, movement and place of articulation. Hand configuration (more commonly 'handshape') describes the extension or flexion of one or more fingers and the orientation of the hand relative to the body and can be described in terms of a hierarchy of complexity, where the 'simplest' hand shapes involve the fewest number of features (selection of fingers, contact between fingers, etc.). Although sign languages are often described as 'manual' languages, multiple channels are used. The hands are the major articulators and their configuration, movement, and arrangement in space provide most lexical and grammatical information. However, other articulators are also involved. Mouth actions include mouthing, which provide lexical information derived from spoken language forms, while mouth gestures are also used for adverbials and echo phonology (**Woll, 2001**).

In most sporting events there are always players and referee(s) who use whistle, buzzers, and bells to conduct the events or games. In deaf sporting events whistle, buzzers or bells cannot be meaningful, making it necessary for visual communication and/or alternatives to be used. For example to signal the start of a race a light might be used or a hand signal while coloured flags might signal a foul or illegal play. The signals for "ball" and "strike" were the invention of William Hoy, who played basketball for 17 years, (**Deaf Sports**). In Games and Sports, umpires express their decision through various standard recognizable signs to carry-out the game smoothly as per laid down rules for the respective games. Different

games and events require different signs and signals for official purposes and informal practices. Coaches are known to use various signs and signals directly or discretely which are usually kept secret and practiced only among the team members. Coaches design new signs and signals to help their team surprise their opponents and win matches, Hence it has to be recognized that signs usually play a major role in coaching. In events involving players with hearing disability the role of a coach in evolving efficient sign/signals to appraise the team workout strategies, motivating players is important and necessary.

When players with hearing and speech disabilities are involved the importance of sign language, visual and contact signaling (vibrator) become very relevant and important. This is because common audible clues (signaling) like whistling are ineffective in players with such disability. This research work focuses on effective sign and signaling for players with hearing and speech disability. Among the various aids developed to help players with hearing disability the efficacy of the vibrator especially in games like football and handball is quite noticeable.

1.7. TRAINING AND HANDBALL SKILLS

The handball is a complete collective sporting modality, characterized by a great amount and variety in its movements, ball manipulations and interaction with other athletes. Elite male handball players, who play indoors on a small court, may be more homogeneous as a whole compared to other ‘‘big playing field’’ sports. Among them, the morphological, physiological, technical tactical, psychic and environmental variables are highlighted.

The evaluation of the performance implicates the recognition and denomination of the individual level of the components of the sporting performance or of a conditioning situation. It is essential that all the variables related to the athletes 'performance be evaluated. Athletes in all sports use psychological preparation as a tool to enhance their performance. Psychological preparation has many different forms and is directly related to personal preference (**Shahbazia, et al., 2011**).

Junior category and psychomotor development of physical availability is medium to be built technical training through a large number of repetitions of specific skills and game skills requiring high-level sensory system. Better results can be obtained only by the players with a perfect individual technique to cope with the increasingly complex situations encountered in the game and as required by the game, often under conditions of adversity, to limit or running out of time (**Ion, et al., 2014**).

In high-skilled athletes, variability increased again (a functional variability that provides flexibility to the system allowing it to cope with perturbations). Several studies have highlighted that movement variability differs depending on the skill level of the athletes and changes during the movement. To score goals in team handball, throwing players must maximize their ball release speed and their throwing accuracy; however, the ball release speed is the main performance factor determining the throwing movement (**Van den Tillaar & Ettema, 2006; Wagner and Muller, 2008**).

In sport and games, particularly ball games, game situations continually change during the event, as well as during a particular movement. Skilled athletes are able to adapt to these changing game situations leading to differences in movement variability. Team-handball throw, (**Schorer, Baker, Fath, & Jaitner, 2007**) movement variability was consistent with a U-shaped curve depending on the skill level of the athlete. **Schorer, et al., (2007)** and **Wilson, et al., (2008)** found a high variability in low-skilled athletes and a decrease in variability of skilled athletes resulting in a more consistent and regulated performance.

1.8. HIGHLIGHTS OF DEAF AND DUMB PEOPLE

Recent education census report says, "Among the 9 percent of handicapped people in India, 80 to 90 percent people are studious to promote themselves in education and social environment. There is a massive enrolment of handicapped students every year and the strength is steadily increasing. For example, among 69 government colleges in Tamil Nadu, around 900 to 950 handicapped students have enrolled and 150 to 175 handicapped faculty members working for the benefit of their fraternity.

Curriculum for deaf and dumb and with other difficulties is entirely different. Because students with difficulties can speak and hear which cover 80 percent of teaching and learning process. But for deaf and dumb, sign language and inter-personal methods such as touch and display can alone be used. Higher education is a concept which shapes the overall personality of a student through extra-curricular activities. Among the extra-curricular activities there are many varieties of events to channelize their positive energy and get shaped as a social well-being. The possible college level extra-curricular activities are,

a) Sports and games (Track events and Individual events)

b) National Cadet Corps

c) National Service Scheme

d) Rotaract Club

e) Red Ribbon Club

f) Green Club for Environment cleanliness

g) Youth Red Cross.

Not long ago individuals having some physical or mental defects were looked down as useless persons for the society. The term ‘Handicapped’ or ‘Disabled’ were leveled against their identity. They were not whole heartedly accepted by others in the society. With the passage of time the outlook began to change.

“Deaf and Dumb” is the term commonly used to describe persons who through being deaf are unable to hear the spoken words of others, and who, consequently, remain dumb. Being deaf is the cause, dumb the consequence. Thus the term "deaf and dumb" is a misnomer, for the deficiency is single, not two-fold, although in the result it affects the two organs of hearing and speech. Among various special populations deaf & dumb is a very common type of disability seen in our society not in a very negligible quantity. It is needed to take special care and attention of this population from their childhood to give them ample opportunity to be self sufficient in future. That is why various schools have been established for the special populations in our country starting from late seventies up to date. It is needed not only to give them education but also to build a healthy body and mind for them

having the prime necessity of physical education as well to make them conscious about their physique, health and fitness (**Ghosh, 2014**).

Social reformers and educationists are striving heard to integrate the physically challenged person with the main stream. It is our social responsibility to see it that physically challenged people leads a self reliant independent and emotionally stable life. Educationists and school administrators are now working together to fulfill that aim. Advancement in scientific knowledge is helping them in many ways in their effort. It is not easy to integrate these people with the society. Due to physical disability, they face many challenges to perform any task as par with the normal people (**Ghosh, 2014**).

Youth is an integral part of democratic society and future asset of mankind. It is universally recognized that Sport is an effective way for channelizing the energies of Youth for productive and meaningful purpose. Fitness has proved as a powerful but highly undervalued and under exploited tool for promoting solidarity and in contributing to an atmosphere of tolerance and understanding to the special population as an undefined part of the society.

After having gone through the various studies, investigator planned to study the effectiveness of Deaf and Dumb students' participation in the college sports activities. The work carried out on hearing impaired players of handball team with and without sign / vibrator shows and proves effectiveness of this type of signaling among such players.

The researcher is working in the physical education department of Presidency College in Chennai which has two departments exclusively for the

hearing impaired students. The interest and enthusiasm shown by these students towards sports made the researcher select this area/topic of research, which should benefit this section of students and coaching abilities as a whole. This is the reason for selecting the topic and carrying out research in the area of sports.

1.9. OBJECTIVES OF THE STUDY

The following are the specific objectives of this study.

1. To find out the effect of specified training with vibrator aid on selected psychomotor variables and skills in handball among deaf and dumb college students.
2. To find out the effect of specified training with combination of vibrator aid & sign language instruction on selected psychomotor variables and skills in handball among deaf and dumb college students.

1.10. STATEMENT OF THE PROBLEM

The present study was to find out the effect of specified training with sign language and vibrator aid on selected psychomotor variables and skills in handball among deaf and dumb college students.

1.11. HYPOTHESES

It was hypothesized that

1. There would be a significant improvement on selected psycho motor and skill related variables in handball due to the influence of specified training with vibrator aid instruction.

2. There would be a significant improvement on selected psycho motor and skill related variables in handball due to the influence of specified training with combination of vibrator aid & sign language instruction.
3. There would be a significant improvement difference between specified training with vibrator aid and combination of vibrator aid & sign language instruction on selected criterion variables among deaf and dumb students.

1.12. SIGNIFICANCE OF THE STUDY

The results of the study may be useful to the following ways.

1. This work explored the use of real-time vibrator and combination of vibrator aid & sign language instructions for teaching sport skills in a realistic scenario.
2. This study will provide guideline for deaf and dumb college men students to improve their psychomotor and handball skills.
3. It would further add to the quantum of knowledge in the area of sign language and vibrator training.
4. The result can be used by the physical education teachers for further development in playing abilities of their trainees.
5. The study may help other physical educators to conduct further research in this area.

1.13. DELIMITATIONS

1. To achieve the purpose of the study, forty five deaf and dumb men students were selected randomly from the Presidency College, Chennai. The subjects' age ranged between 18 and 25 years and their hearing impaired level is 90%.

2. Selected subjects were divided into three equal groups namely experimental group I (**VTG=**15) vibrator aid training group, Group II (**VSTG=**15) combination of vibrator aid & sign language training group and Group III served as control group (**CG =** 15).
3. The following dependent variables were selected for this study: Psychomotor variables namely reaction time and movement time, Skills namely nine meter front throw, dominant hand speed pass, over head pass, accuracy throw, jump and throw and dribbling.
4. The duration of the training period was restricted to twelve weeks and the number of sessions per week was confined to five.
5. The level of significance was fixed at 0.05 level, which was considered to be appropriate.
6. The data were collected prior to and also immediately after the training period.

1.14. LIMITATIONS

1. Subjects' previous training was not considered.
2. Subjects included in the study could not be controlled with regard to their life style, diet and habits which might have influenced their performance.
3. Subject's body type and the socio-economic status of subjects were not taken into consideration.

1.15. MEANING AND DEFINITION OF THE OPERATIONAL TERMS

1.15.1. Deaf and Dumb

Deaf person - a person with a severe auditory impairment, dummy, silent person - a person who does not talk.

1.15.2. Sign Language

Sign language refers to the indigenous language used by the deaf group in a country.

1.15.3. Vibrator Aid

Vibrator aid is an instrument that produce the vibrotactile (pulsation and touch) sensation generally means the stimulation of skin surface at certain frequency using vibrating contactors.

1.15.4. Handball

Handball is a team sport in which two teams of seven players each (nine outfield players including a goalkeeper) pass a ball using their hands with the aim of throwing it into the goal of the other team. A standard match consists of two periods of 30 minutes, and the team that scores more goals wins.

1.15.5. Specified Training

The term specified training"" means "specific to one's sport or activity," which means the individual should be engaged in perfect practice to improve their skills. Sport specific training is simply fitness and performance training, designed specifically for sports performance enhancement. Training programs for sports performance enhancement could include areas such as strength, speed, power, endurance, flexibility, mobility, agility, techniques and strategies.

In the current study, specified training exercises are handball related drills, stretching, cone drills, jogging, rotation exercises, sprints, single jump, burpee, sit-ups, biceps and triceps curl.

1.15.6. Specified Training with Vibrator Aid

In the current study, during the supervised sessions the specified training with vibrator aid group was given the specified training exercises. At the same time, the medium of instruction was given by using vibrator aid only. During the unsupervised sessions, the specified training could have been included with jogging, stretching and rotation exercises.

1.15.7. Specified Training with Combination of Vibrator aid & Sign Language

In the current study, during the supervised sessions the specified training with vibrator aid and followed by sing language group was given specified training exercises. At the same time the medium of instruction was given by using vibrator aid followed by sign language. In addition to the specified training, jogging, stretching and rotation exercises were also executed to the combination of Vibrator aid & Sign Language group.

1.15.8. Reaction Time

Reaction time is the interval time between the presentation of a stimulus and the initiation of the muscular response to that stimulus.

1.15.9. Movement time

The time elapsed between the beginning and the end of a movement.

1.15.10. Passing and Throwing

This is one of the basic, technical elements. A pass must be accurate, fast and tactically useful. A position of hands while catching a ball, decision to whom a pass should be directed depends on the player's position in a particular situation. A pass should be directed to that player whose position may menace the opponent.

1.15.11. Accuracy Throw

Accuracy throw is an act of throwing a handball with the combination of both confidence and precision.

1.15.12. Jump shot

This shot is mainly used by the offence players to attack a tactile group. The performance of this shot is preceded by a cross-legged jump or a jump towards the goal. Correct performance of the shot and particularly the position of the trunk and proper co-ordination of arms and legs make the one the strongest.

1.15.14. Dribbling

A dribble is the act of running with the ball at feet while maintaining possession. It is often used to take the ball around an opposition player.