TPMVol.32,No.S4,2025
ISSN:1972-6325
https://www.tpmap.org/

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EFFECT OF SAQ AND LADDER TRAINING ON SELECTEDPHYSIOLOGICALVARIABLESAMONG COLLEGE MEN HANDBALL PLAYERS

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Abstract
Thisresearchexamineshowcollegiatemen'shandballplayers'physiologicalvariablesareaffectedbySAQ andladdertraining.ItisexpectedthattheeffectsofSAQandladdertrainingwillresultinnotablevariations in a few physiological characteristics of men's handball players. Forty-five individuals were divided into three equal groups at random and allocated to the SAQ trial group, Ladder experimental group and a controlledgroup.Thetraininggroupshadundergonesixweeksofspecifictraining,whilethecontrolgroup retained their regular routine.Pretest and posttest were undergone and the quantitation measurementwere taken for aerobic capacity, agility and speed through SAQ and Ladder training to assess the physiological changes Breath holding time was assessed in seconds and systolic pressure was assessed by digital blood pressuremonitorbeforeandafter6weekofintensivetraining.Theestimateddata'swerecollected ,analyzed and computed with the help of 'F' ratio is determine whether the difference between the group means are statistically significant andindicates thatthere are significant differencebetween group means. The level of significance was set at 0.05 level of confidence and the calculated result stressed that experimental groups obtained enormous improvement in breath hold time and systolic pressure and there byphysiologicallysuperiortothegroupundercontrol.Thus,itisdeterminedthatSAQandladderstraining have a significant impact on handball players' physiological characteristics.

***KeyWords**:* SAQ and Ladder Exercise, Breath Holding Time ,Systolic blood pressure

1. INTRODUCTION

Approximately 19 million people play handball, split across 800,000 teams in the 167 member federations that make up the International Handball Federation.To compete at the best levels, handball players must have a varietyoftechnicalskills(suchshootingandpassing)aswellasfitnesselements(likejumpingability,speed,and endurance) [1].Asaresult,practitionersandscientistsareconstantlylookingintothecrucialelementsandtraits that can differentiate betweenelite and amateur players. Theinvestigation that iscurrentlyavailable on handball playersshowsthatthelevelofcompetitivenessaffectsphysiologicaltraitsincludingstrength,speed,andjumping ability.This implies that identifying effective players may be accomplished by physiological testing.More researchisrequiredtodeterminethetraitsofeliteplayers,asthemajorityofearlierstudieshavefocusedonnon- elite players.Handball players might use this information to assess their physiological and physical traits and create customized training plans.

Sports and activities require both mental and physical skills to perform well.The contribution of the body and themindtohumansuccessisequal.Playingsportscanbenefitbothourbodiesandminds.Forone,unstructured outdoorgamesandactivitiesarecrucial.Encouragesomeonetoplay,runaround,jump,andgotrekkingwithhis buddies; these activities are vital ways for them to release their physical energy.Disport,which means to divert oneself, is the basic meaning of sports [2].By engaging in the fun and fancies of frolicsome physical pursuits, people were able to turn their focus away from the intense demands of everyday life.

An athlete's many physical and mental traits combine to produce a successful sports performance.All things considered, anthropometric attributes are significant when compared to other traits when sports performance is takenintoaccount.Themeasurement ofthehumanindividualisknownasanthropometry [3].Itisanearlytool in physical anthropology that has been utilized in paleoanthropology, identification, understanding human physical variation, and numerous attempts to link physical characteristics to racial and psychological features.

The systematic measurement of the physical characteristics of the human body, mainly dimensional descriptors ofbodysizeandshape[4],isknownasanthropometry.Exercisesrequiringbalance,strength,flexibility,agility, endurance, and control of muscular groups are performed as part of the sport of gymnastics. Athletes possess a variety of mental and physical traits that combine to produce excellent sports performance.When comparing anthropometric attributes to other traits, sports performance is one of the most significant factors.Human individualmeasurementisknownasanthropometry.Inpaleoanthropology,identification,comprehendinghuman physical variation, and numerous attempts to associate physical characteristics with racial and psychological aspects, it is an early technique of physical anthropology.

Themethodicalassessmentofthehumanbody'sphysicalcharacteristics,particularlydimensionaldescriptorsof body sizeand shape [5],isknown asanthropometry.Gymnastics isa sportin which athletesdo movementsthat callfor control,strength,flexibility,agility,balance,and endurance. Sportstraining gained a lotof attention asa result of the development of biology, biomechanical, and physiological sciences as well as the evolution of mathematics and natural sciences, which coincided with significant changes in sports training ideas.Sports training are excellent in preparing, formulating, and developing human capabilities of itsvarious dimensions for the maximum amount of what he can from within the human capabilities and energies of the bombing in the direction of the desired goal, as any observer of the evolution of sports levels in the world may realize.

The training process had to be directed to prepare the rider preparation integrated in all aspects (physical, skills, physiological, psychological) [6], even though handball training is the most important sport training in general and training goals are a private individual access to the highest level athlete.Given the various approaches and trainingplans,itbecomesessentialforthecoachtoselecttrainingplansandtechniquesthatcomplementthetraits and abilities of his players and that enhance their physical development, which in turn raises the bar for digital accomplishments.

Therefore, more research is required to expand our understanding of elite achievement in male handball and to gathercurrentinformationaboutelitemaleplayers.Coachescouldutilizethisinformationtobetterchooseplayers and create training plans that cater to each player's unique requirements [7].Thus, the study's main goal was to investigateanypotentialphysiologicalandphysicaltraitsthatmightdistinguishelitemalehandballplayersfrom teams with varying league positions.We postulated that players on the top teams would possess better physical and physiological traits.

2. RELATEDWORKS

Chidambaram Raja, (August, 2011) Handball is a highly intensive court ball sport that requires quick agile movementswithrapidchangesofdirectionandexplosivepowerduetoitsessentialityofmorereaction ,reflexion and movement time. To excel in handball, players must possessexcellent physiological attributessuch as speed, agility and aerobic capacity. The SAQ and Ladder training are the two popular training methods to improve the same.

(Preetha O, 2006) SAQ Training is a types of training that emphasizes increasing one's rapidity, quickness, and velocity and thereby enhancing his response, reaction and performance by enriching overall fitness and co-ordination and ladder training is the most suitable method for team sports that prepare athletes/players for high intensityactivities.Ithelpstoimproveagility,speed,footspeed,reactionresponseandacceleration.SobothSAQ and ladder training have widely adopted in sports training programs.

(Promoth, K.G, July, 2010) The purpose of the current research was to examine how SAQ and ladders training affectedafewphysiologicalindicatorsinmalecollegiatehandballcompetitors.Individualsinthepresentresearch will be randomly allocated to either a SAQ training group or a ladder exposure group as part of a randomized controlled trial (RCT) or a controlled group.

(Moghimi,J.2017)Asampleof45menhandballplayerswereselectedatanagerangeof18-25yearsandgrouped into15ofeachtastinggroupwiththeinclusion criteriaofactionparticipationandfreefrominjuryalongwiththe exclusion criteria of medical condition affect participation in the mid of the exercise period.

(Wang,J.2020)GroupsforSAQtrainandladdertrainghadundergone6weekintensivetrainingafterapretest with 3 times a week while control group had maintained their regular routine. After 6week post training measurementweretankantoanalyzethenotableimprovementbycomparingtheresultsofthefirstandlasttests.. The ethical considerations were strictly followed like informed and consent obtained from participants and approved by the institution.

Dhanaraj, S Popular tool of SAQ training, Agility ladder to analyze the foot speed and co-ordination and a flat ladder, lay on the ground to perform various footdrills were utilized during training session. The breath holding time and Systolic blood pressure were measured with digital monitors. Finally the quantitative data's collected were analyzed with descriptive statistics to summarize participant characteristics." Each group's pre- and post-training measurements were compared using the F-ratio and SCHEFFE'S tests.

3. METHODSANDMATERIALS

In more than 100 countries, futsal is practiced by over 12 million people at amateur, semi-professional, and professionallevels[8].Itisapopularsportworldwide.Thepopularsportoffutsalhasevolvedintoaprofessional sportinThailand.Youthfutsalplayersmustdevelopboththeirtechnicalandphysicalconditioningtocompetein professional football and futsal leagues, which are employed in some nations as a means of developing young athletesalthoughfutsalisafast-pacedactivity,thetacticalaspect—particularlyaboutphysicalfitness—iscrucial. The activity has a rather high level of intensity [9]. Athletes need to be constantly moving. As a result, poor physical fitnesstraining will impact technical and tactical aspects, reduce the effectivenessof employing special skills in both offensive and defensive games, and reduce the likelihood that the team will win.

To defend the opponent's attack and receive the ball, movement is also required. Since mechanical performance isakeycomponentoffutsalandthefirstprerequisiteforallfutsalathletesandpositionsofplay[10],itnecessitates theabilitytomovequicklyintermsofagility,havepositiverelationshipsandteamwork,andpossessahighlevel of unique ability, particularly in the direction of body movement to prevent the opponent from getting the ball. The player's skills, such as speed, strength, agility, and reflexes, must therefore be developed by Prompoy. Mechanical skills and human motor performance are influenced by muscular endurance, cardiovascular endurance, speed, agility, and flexibility [11]. A futsal athlete is considered an exceptional futsal athlete if he possesses the physical fitness that is one of the many criteria that determine the competition's success.

Toselectanareatogettheballandgointotheshot,playersinthefutsalsporthavetomovewithabodyinmotion that is accelerated, slowing down, and shifting directions of movement to escape articulating and defense to the opponent. This is a sports-related mechanical talent. This mechanical skill, known as futsal agility, is associated with sports. As a result, agility is a crucial component of endurance in futsal [12]. Athletes will gain from being abletoefficientlyregulatetheirmovementsandlinkthemtothestepsoftheirmotorabilitiesincompetitionduring anyathleticevent.Thecoachshouldknowtheprinciplesandtechniquesforexercisingtodevelopflexibilityand agility that correspond to the patterns of motion and ability to move in that sport, as each sport has its unique pattern. Quick positioning by the movement pattern will give athletes an advantage in theongoing game at each chance and every stroke they can make. As a result, it is crucial to create distinct training plans that are tailored to the sport's requirements and skill set.

SAQ training, which consists of speed and agility activities, is a popular and recognized kind of training for developingagility.HaleclaimsthatSAQtrainingiswell-likedandthatitmakesuseoftheneuralandmusclelink training theory to enable precise and effective actions in challenging circumstances [13]. Strong muscles and neurological connections allow athletes to pick up new skills fast and execute them successfully.

High-mobilityathleteshaveseveralbenefits.Thispatternhelpsindribbling,whichcallsforrapidreactions,speed, andagility,aswellaschangingdirectiontoavoidopponents.BecauseSAQtrainingsoftensligamentsandjoints that restrict futsal athletes' mobility, it also helps them show off their skills and improves their agility. It also makesiteasierforfutsalathletestoshiftdirectionwhilerunning.Thisisinlinewiththeassertionthatimproving mobility necessitates practicing that movement and using training concepts as the foundation of the activity accurately, frequently, and quickly, where suppleness is the muscles' and joints' capacity to move through their whole range of motion. The body moves in all feasible directions to cover the entire range of motion. During puberty,stretchingexercisesshouldbedone.Comparedtootherages,thisisgoingtohaveabiggerimpactbecause it will practice remembering to make it easier to move and allow you to precisely regulate movement direction.

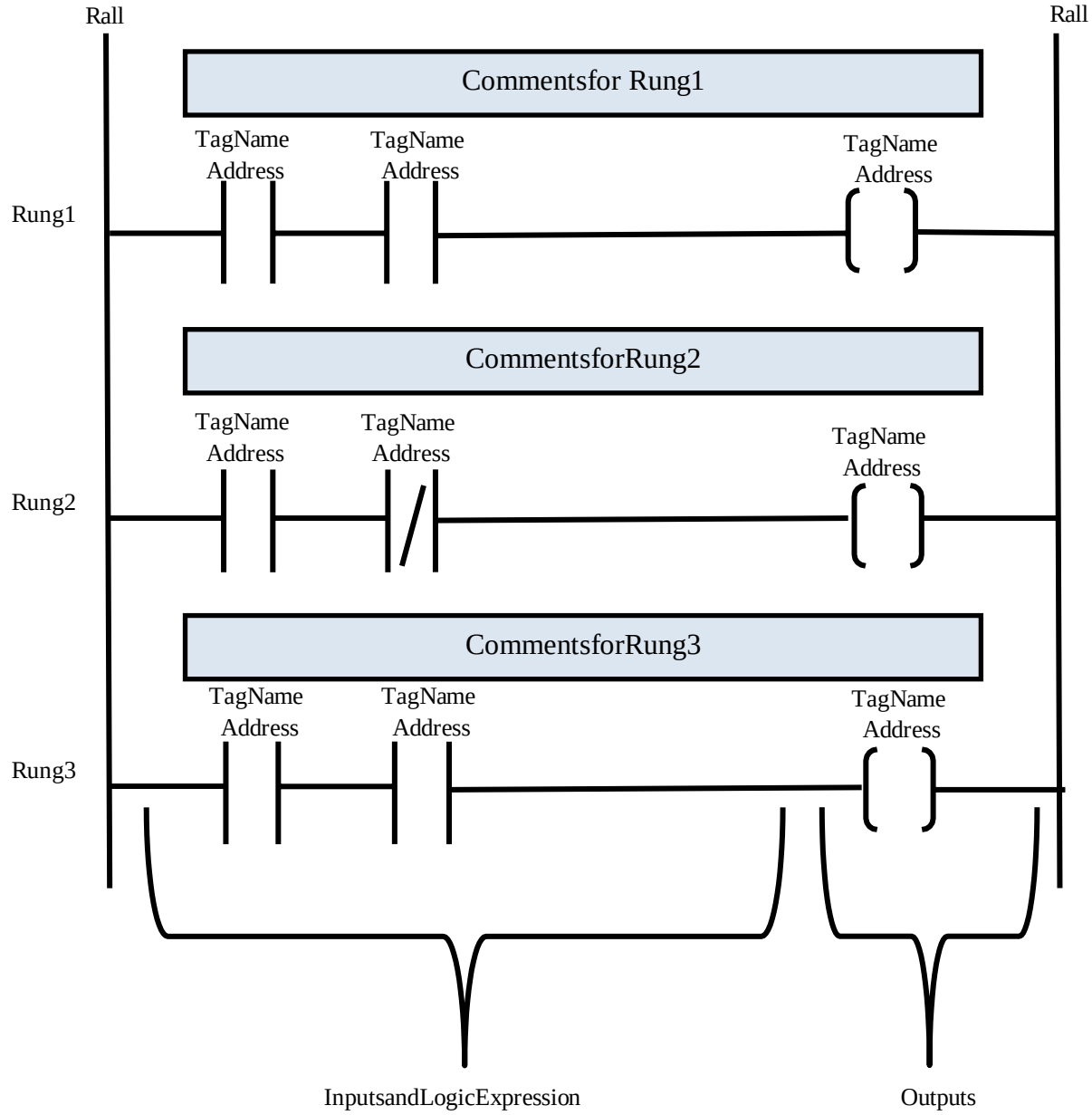


Figure1. PartsofaLadderLogicDiagram
Consequently,theinvestigatorwasinterestedinexaminghowanamalgamationofSAQtrainingandaflexibility program affected the agility of futsal players [14]. Futsal coaches can choose a suitable training style and attain the highest effectiveness with the continued development of foosball athletes thanks to this additional training method, which will assist Thailand's futsal athletes to perform better physically.

Table 1. Covariance analysis of theSAQ Group, Ladder Training Group, and Control Group's Pre, Post, and Adjusted Post Test Means Values on Breath Holding Time (Scores in Moments)

Experiment	SAQclass	Ladder class	Control Group	SV	SS	Df	MS	F ratio	Table Value
Pre Test Despicable	28.46	27.80	27.77	Bw	3.05	2	1.53	0.11	3.35
				Wn	378.94	27	14.04		
PostTest Mean	32.21	28.95	27.81	Bw	104.19	2	52.10	**3.60***	3.35
				Wn	390.96	27	14.48		

Adjusted Post Test Mean	31.75	29.16	28.06	Bw	71.56	2	35.78	**136.83***	3.37
				Wn	6.80	26	0.26		

Table 2. The Scheffe's Test for Comparing Paired Estimates on Breathing Holding Duration (Scores in Seconds)

Means			**Mean Metamorphosis**	**PrerequisiteCI**
SAQclass	**LadderTrainingclass**	**Mechanism Group**		
32.21		27.81	**4.39***	0.12
	28.95	27.81	**1.14***	0.12
32.21	28.95		**3.26***	0.12

Figure1.BarsGraphDisplayingtheSAQOrganization'sPre,Post,andModifiedPostTestMeanResults, Ladder Training Group and Control Group on Breath Holding Time

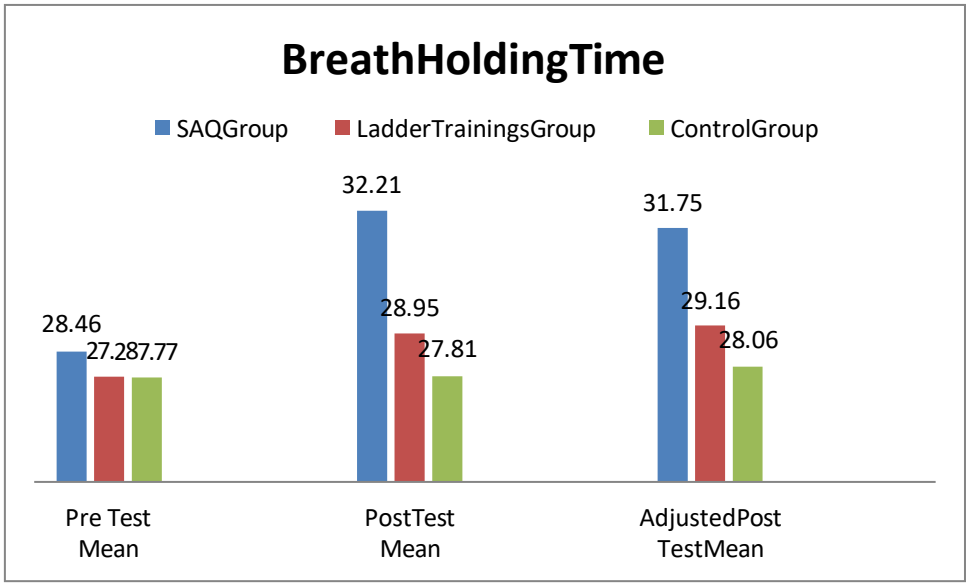


Table 3. Covariance Analysis of the Systolic Blood Pressure Means for the SAQ Group, Ladder Training Group, and the Control Category Before, After, and Adjusted After Tests(Notches in millimeters of mercury (mm Hg)

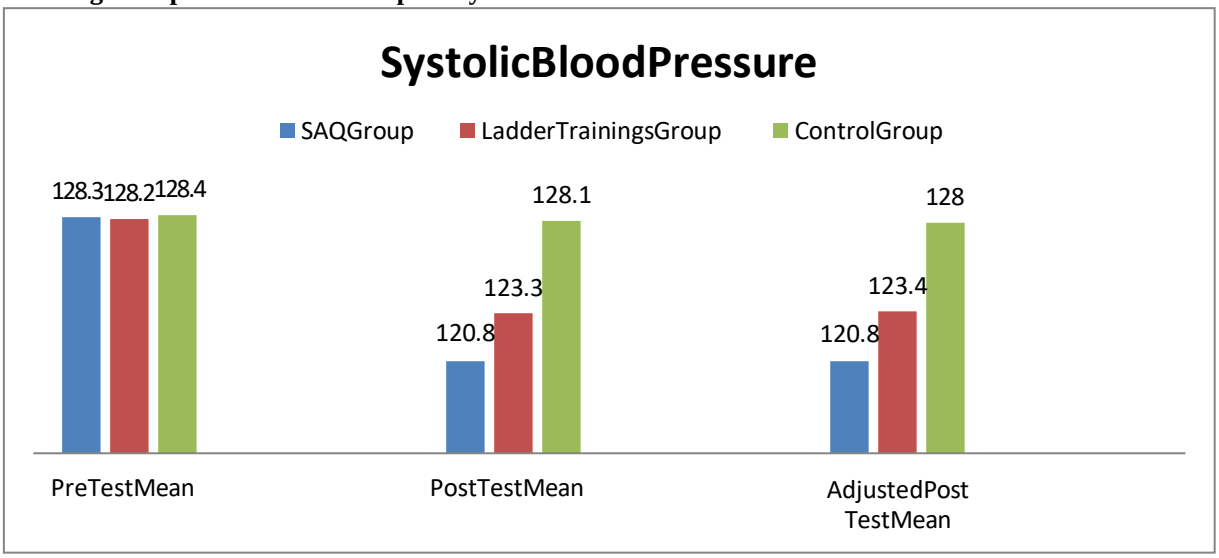
Test	**SAQ Group**	**Ladder Trainings Group**	**Control Group**	**SV**	**SS**	**Df**	**MS**	**F ratio**	**Table Value**
Pre Test Mean	128.30	128.20	128.40	Bw	0.20	2	0.10	0.00	3.35
				Wn	1088.60	27	40.30		
Post Test Mean	120.80	123.30	128.10	Bw	275.27	2	137.63	**3.58***	3.35
				Wn	1038.60	27	38.47		
Adjusted Post Test Mean	120.80	123.40	128.00	Bw	266.27	2	133.13	**73.26***	3.37
				Wn	47.25	26	1.82		

Table4.TheScheffe'sTest for Differing Systolic Blood Pressure Paired Means (Scores in millimeters of mercury (mm Hg))

Means		**Required CI**

SAQclass	LadderTrainingclass	Controlclass	Mean Difference	
120.80		128.10	**7.30***	0.12
	123.30	128.10	**4.80***	0.12
120.80	123.30		**2.50***	0.12

Figure2.BarDiagramShowingthePre,PostandAdjustedPostTestMeanValuesof SAQGroup,Ladder Training Group and Control Group on Systolic Blood Pressure



4. CONVERSATION ON FINDINGS

TheresultsofthisresearchdemonstratethatboththeSAQandtheladdertrainingprogramssignificantlyenhanced the dependent physiological variables—breath holding duration, systolic blood pressure, speed, agility [15], and coordination—and, consequently, the physiological fitness and performance of handball players.

5. CONCLUSION

This study provides evidence that 'SAQ' and 'LADDER' training can be effective in improving physiological values in Handball players. Coaches can use this finding to design evidence, based training programs that cater to the specific needs of handball players.

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