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SHOULDER PREHABILITATION TO WINDMILL SOFT BALL PITCHER: AN PILOT STUDY

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ABSTRACT

BACKGROUND:

Windmill softball is one of the most popular athlete team sport in world . Inspite of windmill pitch softball is immense popularity at the high school and collegiate levels, there remainsascarcity of sports medicine research on the games of notable activity ; the windmill pitch Is conventional belief in soft ball has been that the underhand throwing motion place little stress on the arm and pitching related injuries among windmill throwers are rare . windmill pitching produces high forces and torques at the shoulder and elbow . The injury pattern of softball softball pitchers seems to be primarily overuse injury . But there is little research regarding shoulder prehabilitation in windmill softball pitcher. To study the prehabilitation is becoming increasingly popular among the clinicians and researchers . this content has been applied invariety of contexts. The purpose of the study was describe the before and after the speed of the pitcher in windmill softball pitcher .

MATERIALS AND METHODS:

20 Subjects were taken for this study. All the subjects will receive consent form and Assessment will be taken for those subjects. Subjects who met the inclusion criteria will be included in the study and remaining will be excluded. The subjects who are included in this study will receive ROM stretchings , Thera Band resistant exercises, proprioception exercises for 8 weeks , 3 sessions per week, after the intervention assessment will be taken for all the subjects.

MATERIALS: Hand held dynamometer , Resistant bands

HAND HELD DYNAMOMETER

RESISTED BANDS (IN LBS)

RESULTS :

The result of the study proves that the resisted band exercises for shoulder (prehabilitation programme) shows effective improvement in the shoulder strength in the pitchers of the softball athletes .

CONCLUSION:

The study aimed to find the effect of shoulder strengthening in soft ball players while pitching by prehabilitation intervention programme . subjects showed improvement in MMT (muscle manual test) by using hand held dynamometer . The strength in the athelets showed statistically more improved compared with pre and post values . In this study the muscle manual test done by using hand held dynamometer to measure the strength.

KEYWORDS : Hand held dynamometer, Resisted bands

INTRODUCTION

Soft ball is one of the summer Olympic sports , its popularity increasing now a days in india. Recentlly 36th national games in Gujarat softball played in khelo india programme . This game require a ball 12 inches in the circumference that is pitched [(1)] . It is a team sport that enables females and males of all age groups to participate and its primary method include hitting, catching and throwing. • Softball objective is to win by scoring as many points as possible and completing all bases . soft ball is a relatively simple sport to learn because the fundamental techniques and motion required are few pupils are only urged to throw, catch, hit and run. [(2)]

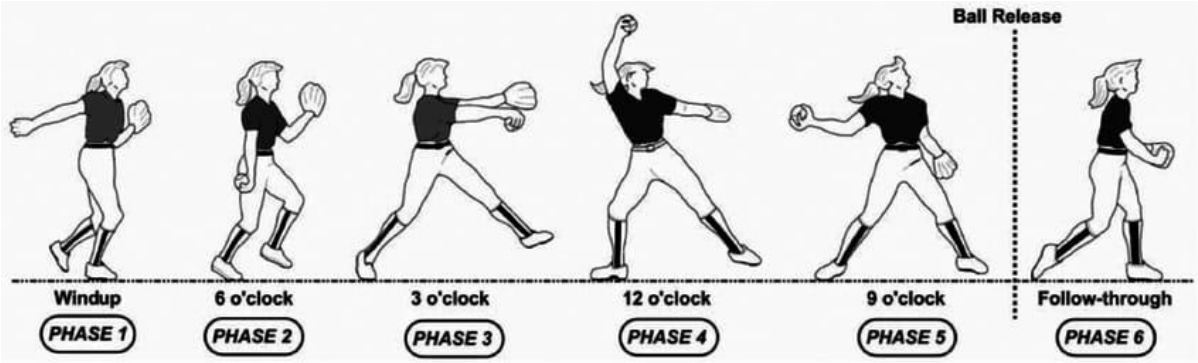
WINDMILL TECHNIQUE: The technique used with regards to windmill softball pitching is supposed to be one of the most efficient as far as energy goes, meaning that you could pitch several games if needed. It also decreases the risk of injury when done correctly. [(3)]

• In the open door position, imagine that you have a dot on both shoulders, a dot at your hip, and a dot at your other hip. When you face the catcher in the very beginning of your full motion, all four dots are facing your catcher.

• As you “open your door” for the open door position, you’re pointing your glove hand at your catcher, and no dots are showing to your catcher. When you do your backswing, open your door. [(5,4)]

• Then when you get ready to slam the door, you come down, snapping at your hip. Slamming the door means you bring your hip through where both feet are facing the catcher and all four dots are back to the catcher again. And you’re in a defensive position ready for the ball to come back to you. It’s going to look like a full motion, close door, swing it back, open door, release the ball, close the door again—or slam that door, which is what we call it because we want explosion there.

. • Door position, imagine that you have a dot on both shoulders, a dot at your hip. [4]



PREREHABILITATION :

Is a form of personalised risk assessment and exercise protocals to train athletes to their maximums potential while reducing the chances of unwanted injuries . [6] Prehabilitation a term introduced in the 1940s , is becoming increasingly popular among clinicians and researchers The rules applying to softball pitching differ considerably from baseball[7]. The ball size and weight vary across different organizing bodies. Generally ,for younger ages , the ball inches in circumference, and for older players (12+yr of age), the ball is about 12 inches with a weight between 6 ¼ oz and 7 oz compared with a baseball weight of5 ¼ oz and circumference of 9.25 inches [8]the pitcher mound to home plate is 40 ft for players younger than 12 yrs and increases to 43 ft for those older than 12 yrs. This compares with baseball ranges of46 to 60 feet and 6 inches at a maximum. [9] The game there are 9 players on a softball team, the playing field is divided into the infield and out field ;the line between the bases are 60' apart and when joined they forma diamond ,inside the baseline is known as the infield , outside the baseline but inside the playing field is called the outfield. An official game is 7 innings (a inning is when both teams have had their turn to bat). The pitcher must have both feet on the pitchers rubber and can only take one step forward while pitching, the ball must be thrown underhand . The batter is out if and when; 1. Three strikes have been called.2 a fly ball is caught 3. The batter does not stand in the batter's box. [10] There are multiple techniques describe for different softball pitches , Fastball :thrown with a four seam grip (pads of the fingers on the laces at the side of the U on the ball), and requires a snap of the wrist at the end of the delivery , with a normal for a follow through. [11] Change up : throw with ball deeper in hand the motion is the same follow through, without wrist snap needed for a fastball. Drop pitch : throw with four finger grip at the U potion of the seam . at the ball release , the fingers are pulled back and up creating a downward spin. Curveball: thrown with a three finger grip with the ring finger on the U of the laces , with the ball release , the pitching arm across the body . Rise ball: thrown with two fingers on the narrow portion of the laces, and the wrist twisted into supination at the release. [11]

The activity of eight shoulder muscles during the windmill fast pitch softball throw,the supraspinatus muscle fired maximally during arm elevation from 6 to 3 o clock position phase , centralizing the humeral head with glenoid . [12] the posterior deltoid and teres minor muscle acted maximally from the 3 to 12 o clock position phase to continue arm elevationand externally rotate the humerus . the pectoralis major muscle accelerated the armfromthe12o clock position to ball release phase the serratus anterior muscle characteristically acted to position the scapula for optimal gleno humeral congruency and the subscapularis muscle functioned as an internal rotator and to protect the anterior capsule. [13] The windmill pitch generated much more torques , particularly during abduction and extension in adolescent softball players ranging from ages 11 to 15 years , anterior shoulder pain related to rotator cuff/biceps, pathology and labral pathology were the most commonin13 to 15 years old softball windmill pitchers, when compared among all adolescent high school softball players [14] . Epicondylar injuries in softball position players also commonly occur(incidence of up to 39%) with the highest percentage of injury occurring in high school players between the ages of 14 and 18[15] .

The purpose of the study was to examine the pre and post speed of the pitcher after giving the prehabilitation for windmill softball players .By improving the shoulder strength by using different methods like therabands and strengthening exercises for shoulder.

NEED OF THE STUDY:

There has been no study reported or documented to compare the shoulder prehabilitation techniques in wind mill soft ball players in improving the shoulder strength while bowling in soft ball players . It is essential to improve the strength of the female players in india so present study was designed to explore the effective training method to improve the performance of the windmill soft ball players and increase there speed while bowling.

RESEARCH AND METHODOLOGY:

- STUDY DESIGN : Pilot study
- STUDY SUBJECT :Soft ball player.
- SAMPLE SIZE : Sample Size of 20 subjects taken
- STUDY SETTING AND SOURCE OF DATA: Keshavarao Peta village ground(ECHARLA –SRIKAKULAM A.P)
- INTERVENTION PERIOD : 6-8 week.

OUTCOME MEASURES :

1. Shoulder muscle strength in Kgs

2. MMT through hand held dynamometer

INCLUSION CRITERIA :

• In the age between 12 to 18

• Gender both male and female

• Windmill pitchers

EXCLUSION CRITERIA : • Other than windmill pitcher such as Change up ,Drop pitch ,Curveball and Rise ball.

• Subjects who underwent recent shoulder surgeries (less than 6 months)

• Subjective who taking any kind of medication WADA banned medications 2022-2023.

• Subject who taking separate fitness training and gym training other than the academyand our intervention.

PROCEDURE:

20 Subjects were taken for this study. All the subjects will receive consent form and Assessment will be taken for those subjects. Subjects who met the inclusion criteria will be included in the study and remining will be excluded. The subjects who are included in this study will receive ROM strechings ,TheraBand resistant exercises, proprioception exercises for 8 weeks , 3 sessions per week, after the intervention assessment will be taken for all the subjects. And assessment was taken for the subject MMT(muscle manual test) with the help of the hand held dynamometer and check the speed of the pitcher without givening the intervention with the help of the speedometer and given the intervention for 4 weeks with therabands for shoulder strengthening and then check and re assess the speed of the pitcher and MMT of the subject. Subjects were selected according to inclusion criteria and the procedure was explained . demographic data like age ,gender and baseline characteristics like type of the game and training etc were recorded .muscle manual test was recorded by using hand held dynamometer and test at pretest . resisted band exercises was given and followed by post test measures.

RESISTED BANDEXERCISES: Resistance bands are elastic bands that add tension to an exercise to make it more difficult and engage more muscles . there are several different types of resistance bands available .

RAISE EXERCISE: Raise the arms to shoulder height. Keep the arms slightly in front of the body . Keep the elbows slightly bent when raising the arms. 21 .

ROTATE EXERCISE: Secure the elastic band at one end e.g holding the one side the therapist. Rotate the arm while keeping the elbow near the body at all times . Keep elbow flexed at all times

SQUEEZE EXERCISE: Shorten the elastic band and straighten the arms in front Stretch the elastic band and squeeze the shoulder blands Keep the elbows slightly bent at all times.

RAREDELTROTATIONS: This exercise will work the rear deltoid . as we pull the band backward externally rotate the arm. The rear deltoid extends and externally rotates the arm , so we use the band to add resistance as we move arm in those range of motions.

Fig 1 : Shoulder extention exercise

Fig 2: lateral raise exercises

MUSCLE MANUAL TEST.(MMT) WITH HAND HELD DYNAMAMOMETER.

The hand held dynamometer is an objective method in detecting minimum muscle strength change which has an impact on the physical function . the minimal change in the force can be measured in units of weights such as pounds or kilograms. The evaluation of muscle performance may be accomplished by using a number of tests, including manual muscle testing (MMT), isokinetic dynamometry, and hand-held dynamometry (HHD). In the field of sports medicine, hand-held dynamometry (HHD) is gaining considerable interest over isokinetic testing, since the equipment is not expensive and easy to use on the field or training area of the athlete. A hand-held dynamometer (HHD) is a portable measurement device often used for assessing muscle function. Handheld dynamometry (HHD) is an efficient, objective, sensitive, and affordable alternative for strength quantitation. A small portable device is held by the examiner and place against the patient's limb during a maximal isometric contraction. The device can be used to test both proximal and distal muscles in all extremities. Specific dynamometers are used to test grip strength. The testing positions are standardized to reduce variance of serial measures. This strength measure is more sensitive to change than MMT and correlates well with fixed dynamometry up to 30-kg force. As with MMT and fixed dynamometry, variability of test results increases when multiple raters are used in longitudinal assessment.

DISCUSSION

In our study we used resistant band with different colours (indicate different resistance) and we noticed significant strength improved, few other studies support our studyK.J.,Almaddah(2019) The result of the study indicate that resisted band exercises can be promising intervention increasing the shoulder strength in the baseball players, and also increasing in the speed(Yoon,J.H.,(2020)) of the pitching.

In our study is a single group , pre and post tests clinical trail performed on the professional athletes . 10 female athelets and 10 male atheletes under 18 years with minimum shoulder strength . All subjects were evaluated with MMT through hand held dynamometer . Research has proven that resistance band exercises grow our muscles and tone them at the same time(physiology) In response to exercise, humans alter the phenotype of their skeletal muscle; changing the store of nutrients, amount and type of metabolic enzymes, amount of contractile protein, and stiffness of the connective tissue, to name but a few of the adaptations. The shift in phenotype is the result of the frequency, intensity, and duration of the exercise in combination with the age, genetics, gender, fueling, and training history of the individual (Joyner and Coyle 2008; Brooks 2011). . Toning

your muscles is simply the process of losing body fat so that muscles appear on the surface of your skin. There are no specific exercises to tone you muscles. Resistance bands can add muscle-building power to most types of workouts. They're also excellent for rehabilitating muscles after injury. Resistance bands come in several strengths, making them highly usable by most people.(MikeskyAE, Topp R,1994)

During overhand pitching , the stability of the glenohumeral joint compromised when the humeral rotates internally and adducts horizontally while maintaining a position of 90%ofabduction .(StevenW.Barrentine.Volume 28 ,1998).

The total circumduction of the arm about the glenohumeral joint from the initiation of stride phase to completion of the movement is about 485 degrees of significance is that this windmill motion is performed rapidly with a softball that weighs 6 to 7 OZ by design compared with the baseball of weighs 5OZ.(Glenn S. Fleisig, phD, Volume 28 , 1998)The highest biceps brachii activity was measured during the fifth phase of the windmill pitch, from 9o clock to ball release . the highest reduction of elbow angular velocity was apparent during this phase , in which the highest level of biceps eccentric contraction is most likely to occur.(Idubijes L. Rojas,Matthew T.2009) To find out the interpretation of data, the pitching motion was separated into four phases: windup, stride , delivery, and follow through . The wind up phase phase defined as time from initial movement from the ready position until lead foot toe off . The windup phase wa sdefined as the time from initial movement from the ready position until lead foot toe off . the stride phase was defined as the time from lead foot toe off to lead foot contact(foot flat) with the ground . the delivery phase was defined as the time from foot contact to release of the ball . the final phase was follow through , which occurred from the instant of ball release until the forward motion of the throwing arm has stopped.(James A.Whiteside,MDVolume28,1998) The shoulder is one of the biggest a and most complex joints in the body. It provides a wind range of motion arm that allows to do everything from scratching the back to throwing a perfect pitch . its very important to keep the muscles around the shoulder healthy.Resistanceband exercises provides great results in athelets it allows the shoulder muscles strengthen .(Rio,E.,Kidgell,D.,Purdam, 2014) Dynamic training and strength training differ primarily in the fact that resistance training provide a vigorous increase in peripheral vascularresistance . Strength training , high isolated forces generated in the activated musculature whichcompresses the small arteries and thus increases the peripheral vascular resistence(M.R.,Barker,J.Ciochetty,2019) Although the present study is to describe the increase in the shoulder strength duringsoftball pitching by using prehabilitation programmes with (resisted band exercises).it helps intheimproving the strength of the shoulder muscles in the pitchers and also helps in the increasein the speed of the pitching .the resistant band exercises for each subjects was givenfor 4weeks . and this intervention shows the significant results that increase in the shoulderstrength in 2 or 3 points in kgs increased by using hand held dynamometer(Werner ,SL,2005)in pre and post test assessment.

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