

Four Basic Types of Strength & Conditioning Exercises.

1. Prehabilitation/Rehabilitation Exercises

What are they?

They can be your warm-up drills, mobility drills, flexibility movements and sport-specific drills.

Why do them?

- They help increase your range of motion and allows for better movement during your training.
- They also help prevent injury as most of such movements strengthen up our stability in our joints.
- More sport-specific drills can be added to help increase coordination and conditioning of the muscles specific to the sport.

When to do them?

- Prehab/Rehab work can be done at the start of your program. This is when you are not fatigued from the workout and can concentrate on targeting the correct muscles in the movements.
- Additional stretching and flexibility work can be added to the end of the workout to further increase range of motion and facilitate recovery.

2. Power-Based Exercises

What are they?

Movements that require you to be explosive and develop as much force as possible in the shortest period of time. They

include your jumps, throws, and Olympic-weightlifting movements.

Why do them?

- They allow you to increase your rate of force development which is critical and most of the time a key performance indicator in more sport settings.
- Some of the movements involved are more complex and require coordination of the body (e.g. the Snatch/Clean+Jerk).
- They build your muscles up to move faster, allowing you to have better movement speed (e.g. being able to move your leg fast enough to catch yourself when you fall).
- Better activation of the core as such movements are dynamic and require your spine to be in a stabilized position constantly while the movement is performed.
- And because you are developing high force in fast speeds, you are doing more work more rapidly, increasing your energy-expenditure and subsequently allowing weight loss.

When to do them?

- Similar to Prehab/Rehab movements, they require concentration and coordination so they should be done early in the program if possible.
- They can be placed immediately after a strength-based exercise to allow for potentiation in the muscles (which simply means that the strength exercise will give a boost to your muscles and warm them up to perform an explosive movement).

3. Strength-Based Exercises

What are they?

Usually the Three Big Lifts (i.e. The Squat, The Deadlift and The Bench) and their assistance exercises.

Why do them?

- They allow your muscles to develop as much force as possible through a range of motion, giving you the foundation required for your training.
- They also help increase muscle mass and with more muscles mass, energy expenditure is increased, allowing for weight loss.
- The strength built can later be transferred to power which is critical in a lot of movements we perform daily and in sport.

When to do them?

- This will take up the bulk of the program as you can target various body parts and muscle groups.
- They can be done after prehab/rehab work at the beginning of the program.
- A low level of coordination is required so they can also be performed after power-based exercises.
- The main goal of strength-based exercises is to increase the strength in your muscles and the ability to produce as much force as you can. That's why they make up the bulk of your program.

4. Core Exercises

What are they?

Any movement which requires your core to be in a stabilized position. The misconception that many have about core training is that the core needs to be worked with crunches/sit-ups which is seldom the case.

Why do them?

- The core (as the name suggests) provides the stability in all our movements.
- Force and power is never generated from the core but by the limb segments and is magnified if the core is stable.
- For example, throwing a ball requires moving your arm through a certain range. However, the first muscles to be activated are in fact your core muscles to give you that stability and allow you to transfer the force from your hips to your shoulders then to your arms.

When to do them?

- Core training is traditionally done at the end of the program as you would want to “save your energy” for your major exercises and core training is seen as an accessory form of training.
- Moreover, your core would already be at use when you perform the Big Lifts which require a lot of stabilization in the trunk to allow for safe lifting.
- Another recent discovery is that core training can be performed before your major movements to allow for the core to be pre-activated and facilitate stability when performing the major lifts after.
- However, it's a fine line getting the right amount of core work done for pre-activation and not tiring it out so much that it affects your major lifts. So my suggestion is to perform just one exercise engaging your core if you intend to do core work before major lifting.

Speed and Agility

- Improve acceleration
- Increase maximal velocity
- Maintain velocity against the onset of fatigue

- Decrease reactive ability and reaction time
- Improve deceleration
- Enhance the ability to change direction
- Improve co-ordination and dynamic balance

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STUDY: ASMI

1999 476 9-14 year olds followed for 10 years

Findings

1. 100 innings per year saw increase in serious shoulder and elbow injuries
2. Pitching and catching combination saw increase in serious shoulder and elbow injuries
3. Curve ball showed no significant increase in shoulder or elbow injuries

Recommendations

1. No overhead throwing of any kind for 2-3 months per year
2. Follow pitcher counts and rest days
3. Avoid pitching on multiple teams with overlapping seasons
4. Learn good throwing mechanics as soon as possible
Learn in order
 - a. Basic throwing
 - b. Fastball pitching
 - c. Changeup pitching
5. Avoid pitcher/catcher combinations

Factors that influence injury rates: ASMI 2011

1. # of innings pitched per season *
2. Pitching while fatigued *
3. Pitching Year round *
4. Types of pitches *
5. Improper mechanics
6. Pitcher catcher combinations
7. Technique and skill level

A 3-4% decrease in Rotator cuff (RC) strength results in potential loss of dynamic stability

Andrews & Fleisig - ASMI 2007

AGE	Max/Game	Games/Week
11-12	50	2
13-14	75	2
15-16	90	2
17-18	105	2

MINIMUM # OF PITCHES THROWN/REQUIRED SPECIFIC REST

AGE	1 Day	2 Days	3 Days	4 Days
11-12	27	35	55	58
13-14	30	36	56	70
15-16	25	38	62	77
17-18	27	45	62	89

How Far Do You Throw? Are You Special?

AGE	DISTANCE IN FEET					
	Avg	1SD	2SD	3SD	4SD	5SD
8	95	109	123	137	151	165
9	105	123	141	159	177	195
10	123	140	157	174	191	208
11	135	155	175	195	215	235
12	141	166	191	216	241	266
13	164	188	212	236	260	284
14	196	225	254	283	312	341

SD = STANDARD DEVIATION

3SD Yellow = 26/10,000 4SD Orange = 1/100,000 5SD Red = 1/1,000,000

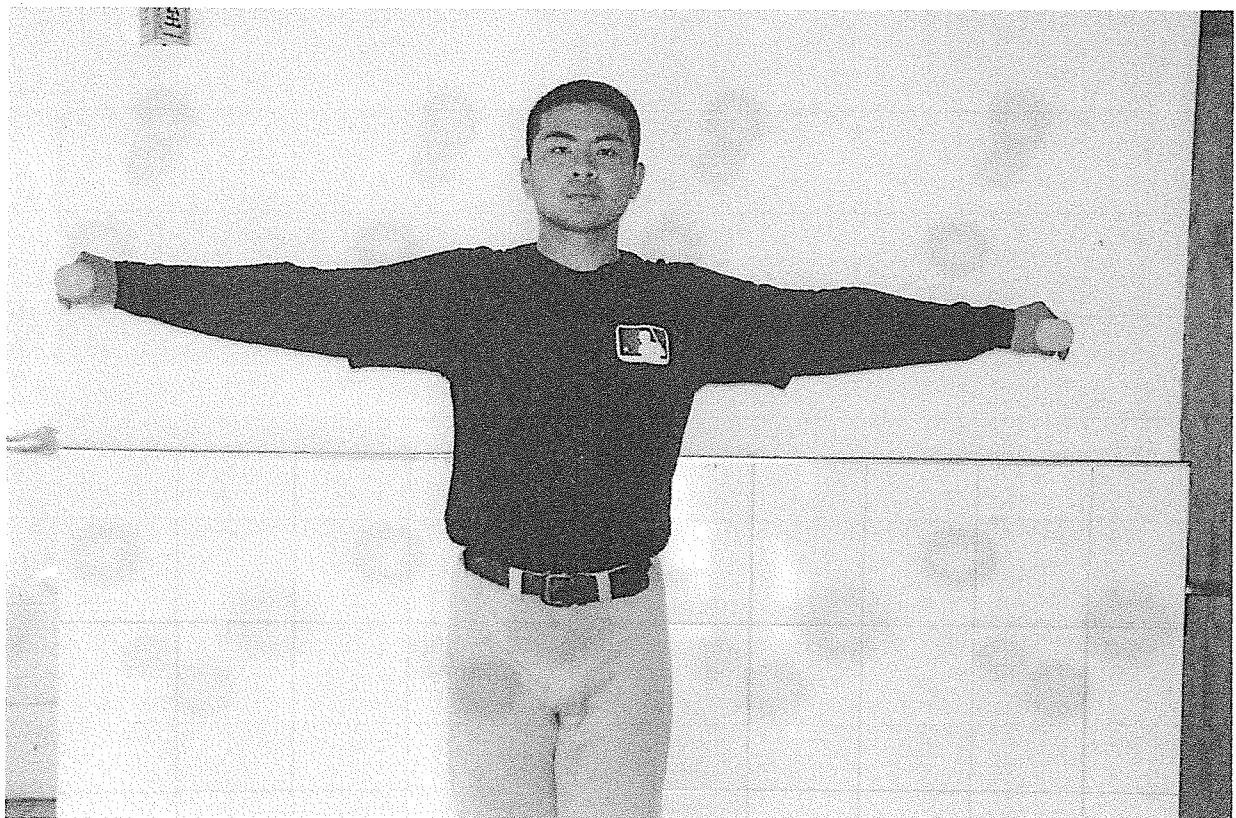
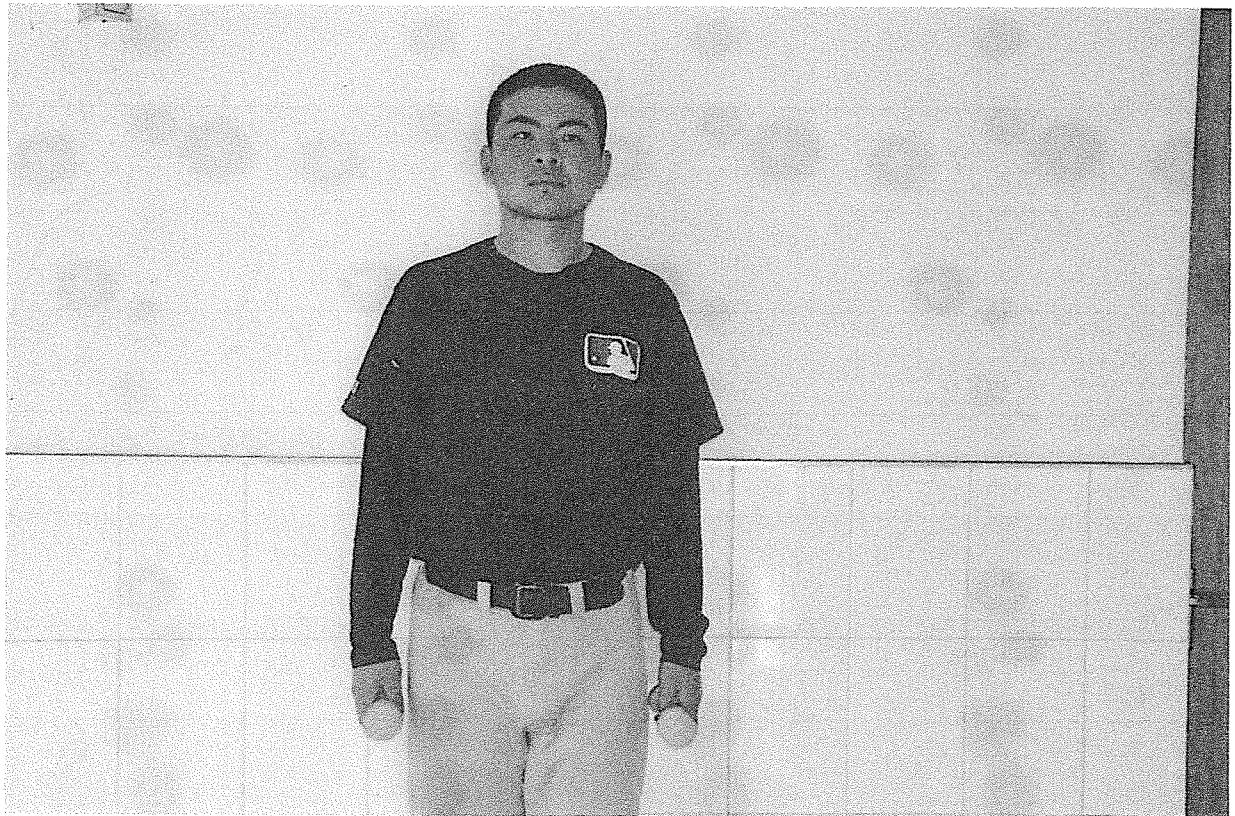
How Fast Do You Throw? Are You Special?

AGE	SPEED MPH					
	Avg	1SD	2SD	3SD	4SD	5SD
8	40	43	47	50	54	57
9	43	47	51	55	59	63
10	46	50	54	58	62	66
11	48	52	56	60	64	68
12	50	55	60	65	70	75
13	54	59	64	69	74	79
14	60	66	72	78	84	90

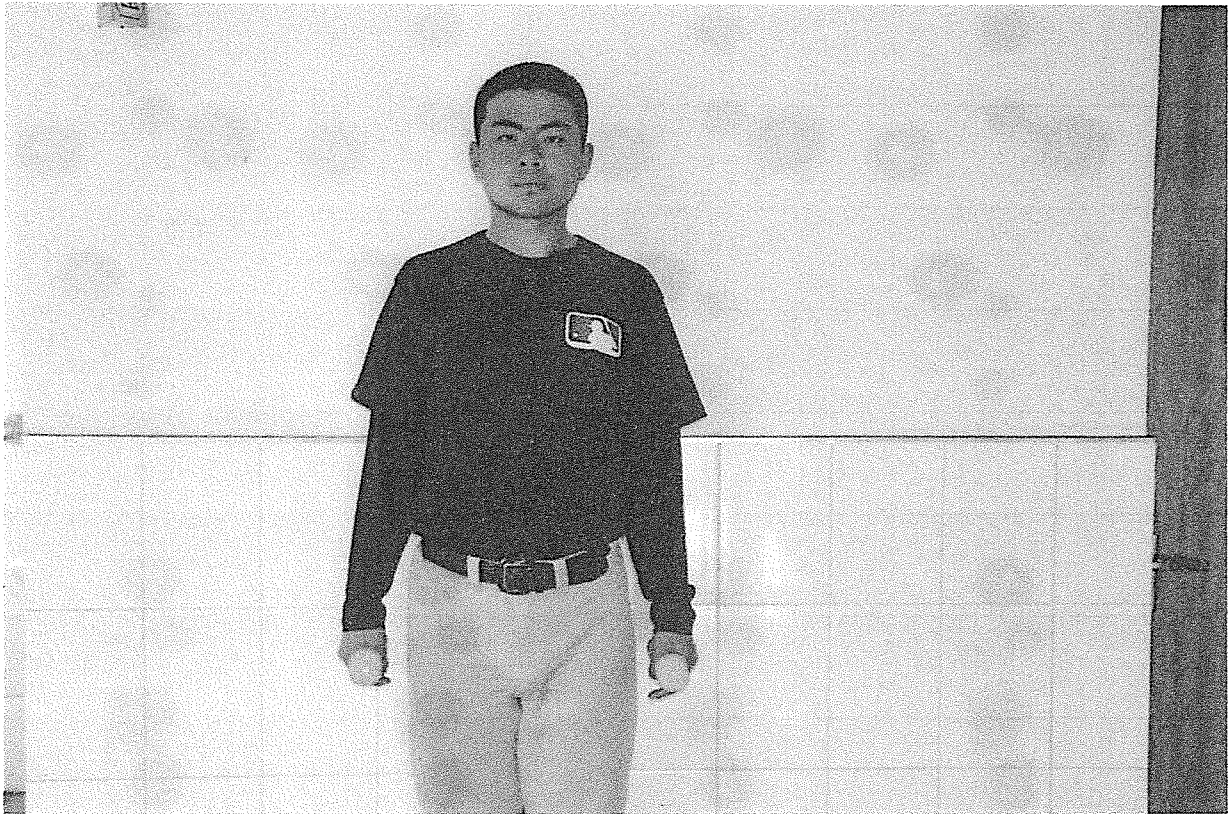
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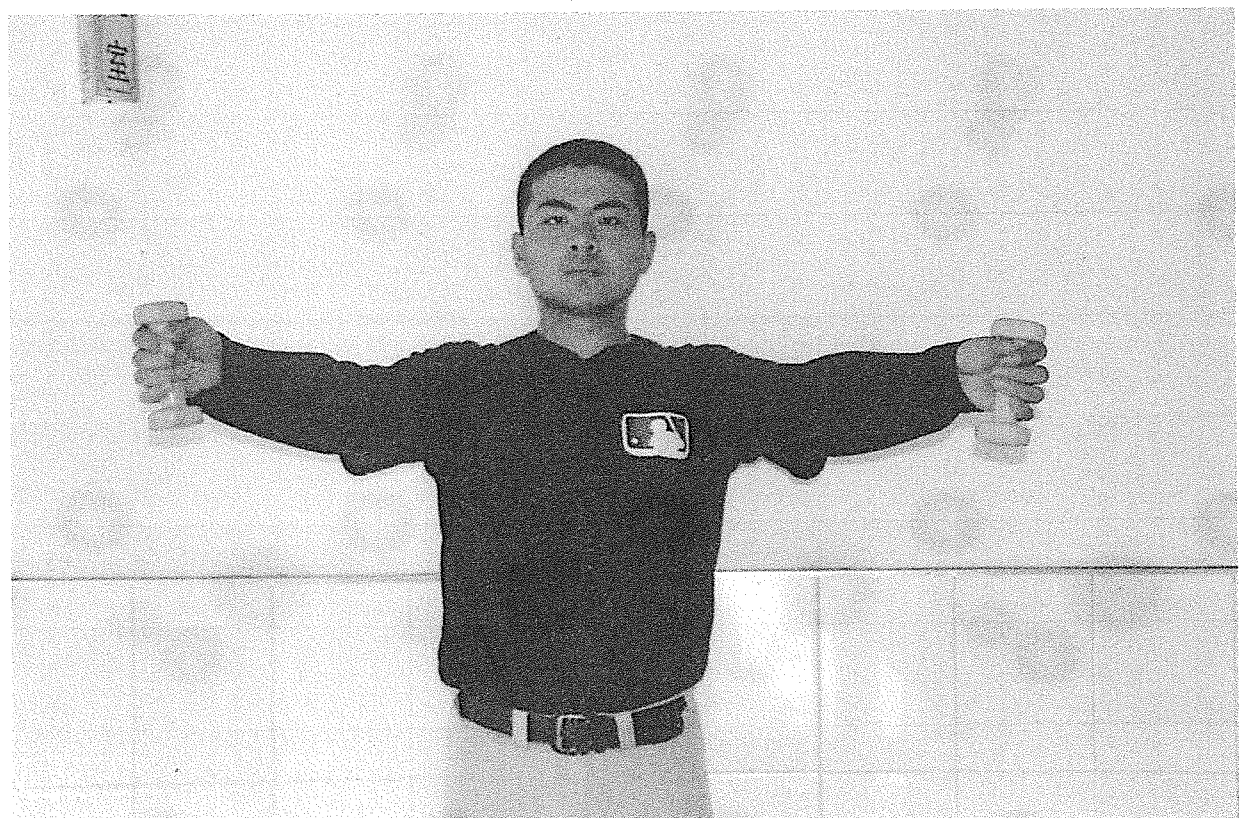
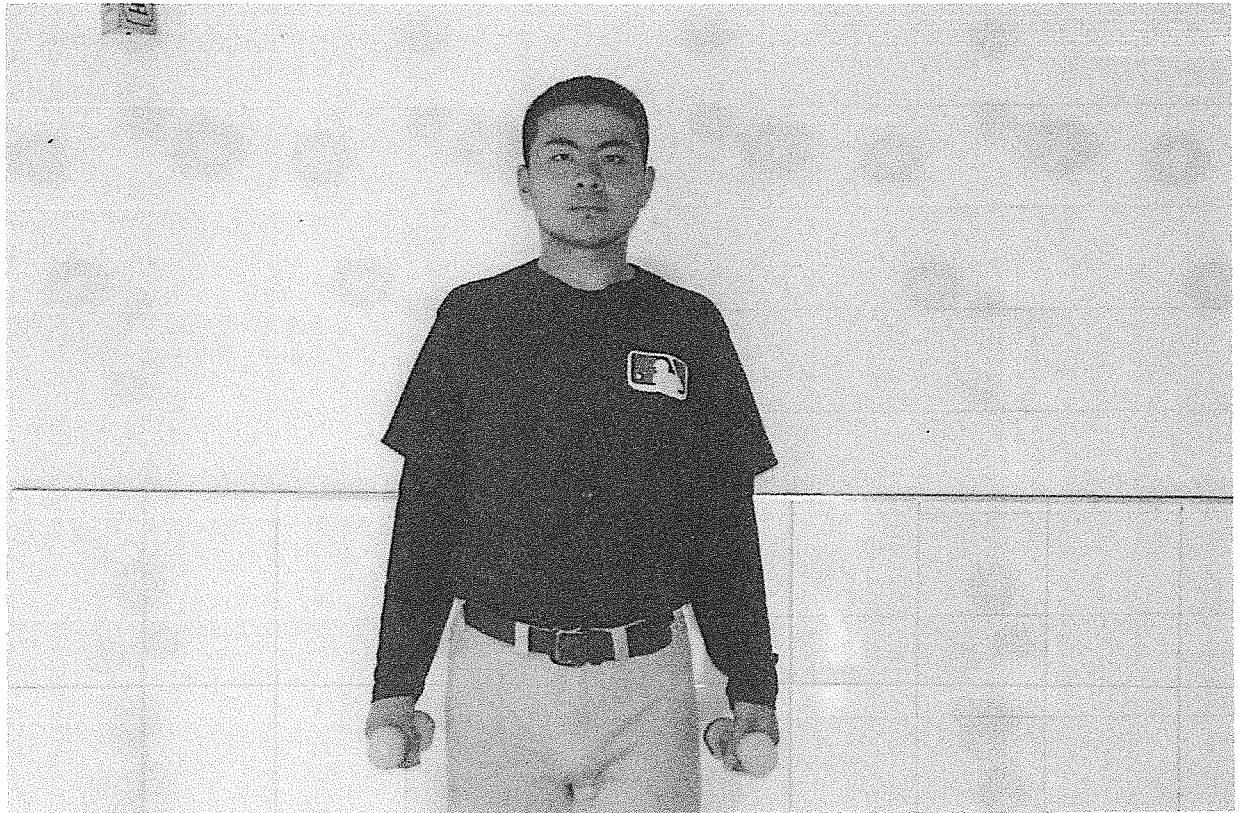
STANDING SHOULDER ABDUCTION



STANDING SHOULDER FLEXION

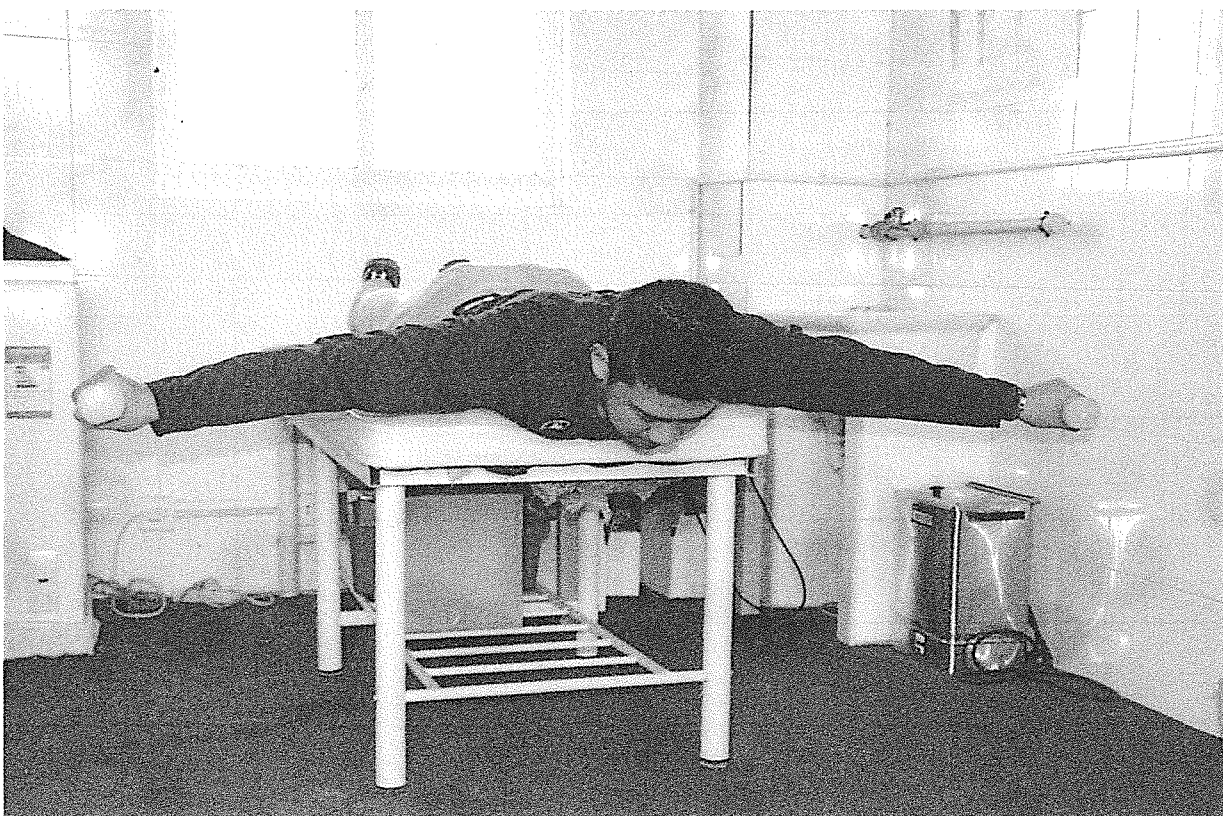
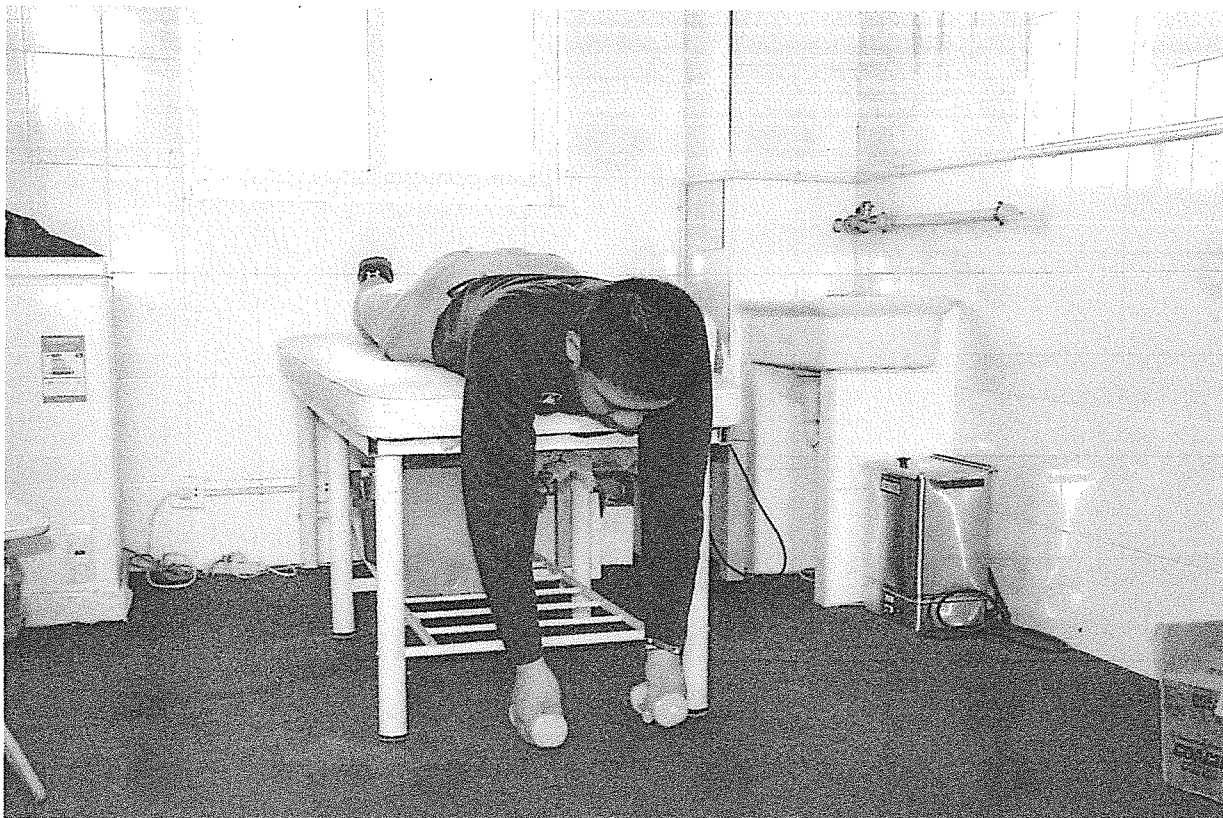


STANDING SHOULDER SCAPTION



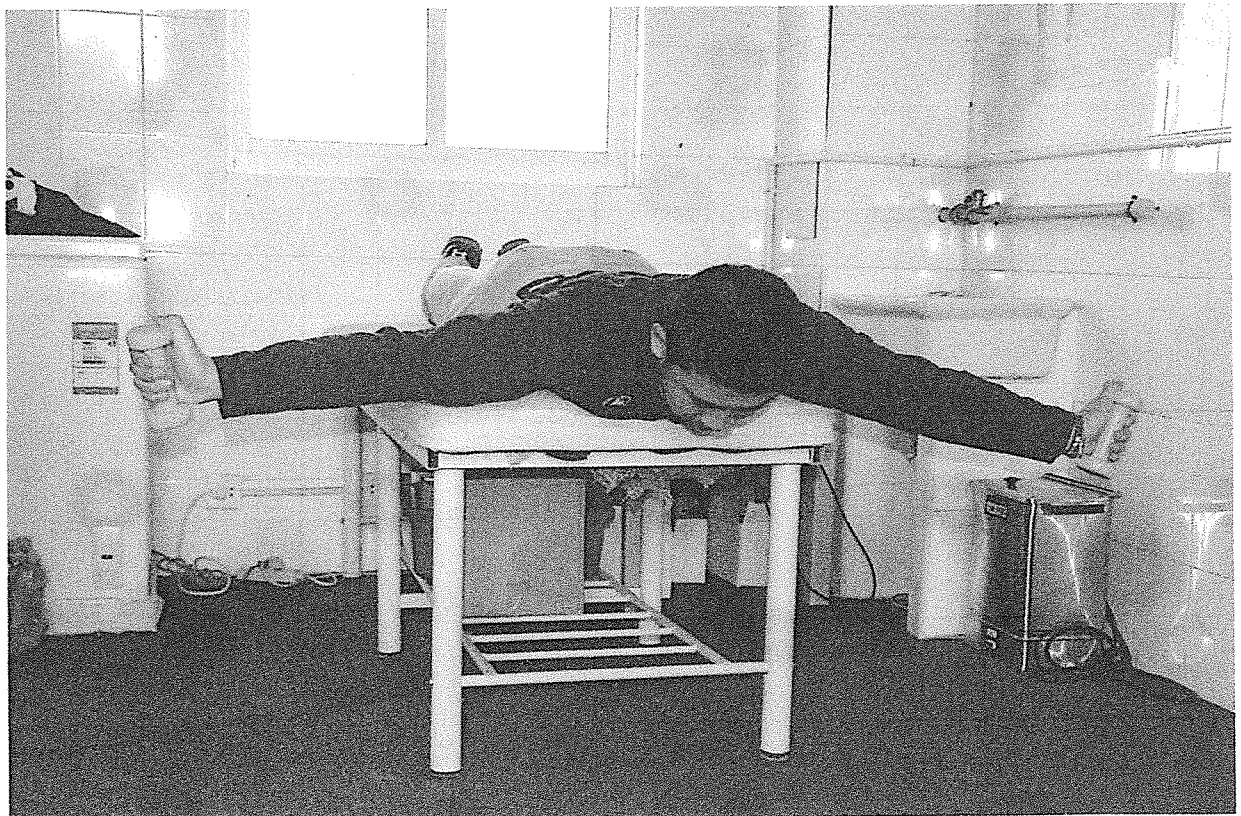
PRONE HORIZONTAL ABDUCTION

Palms Down



PRONE HORIZONTAL ABDUCTION

Thumbs Up



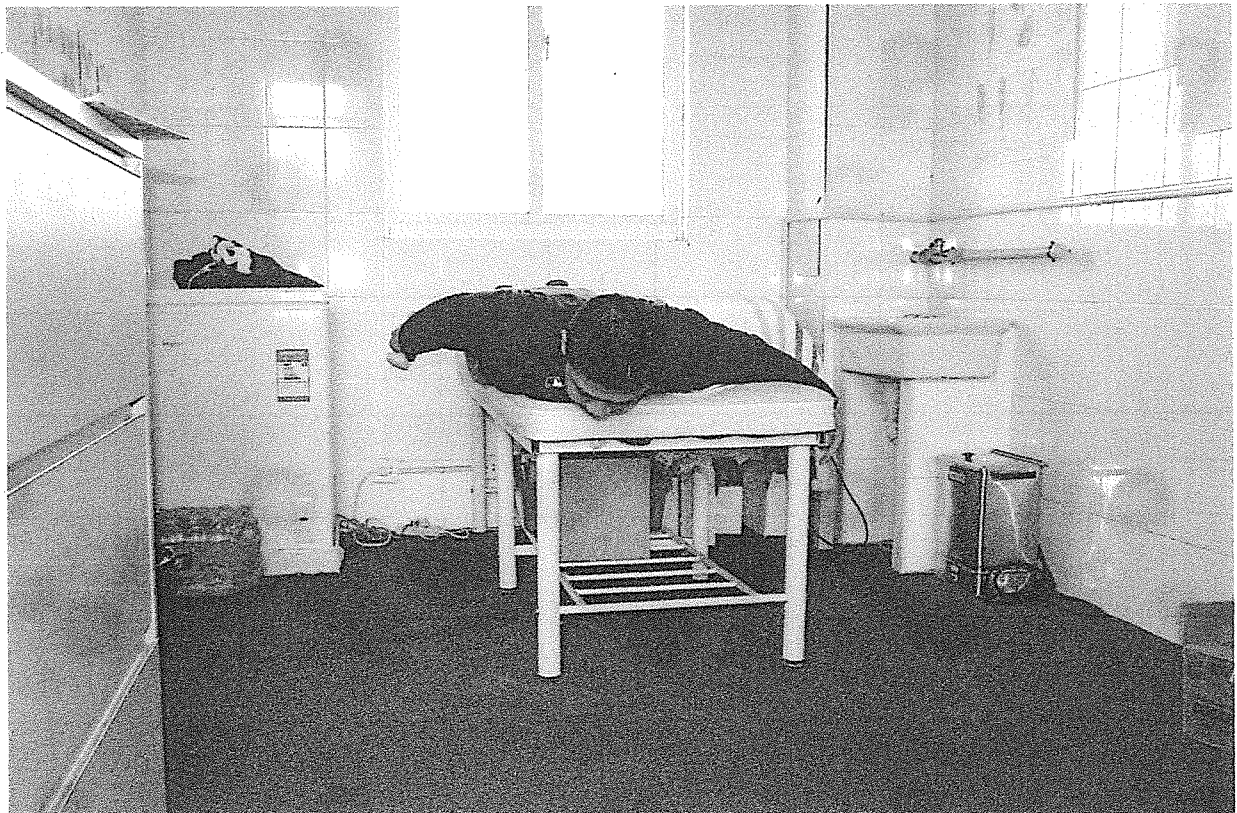
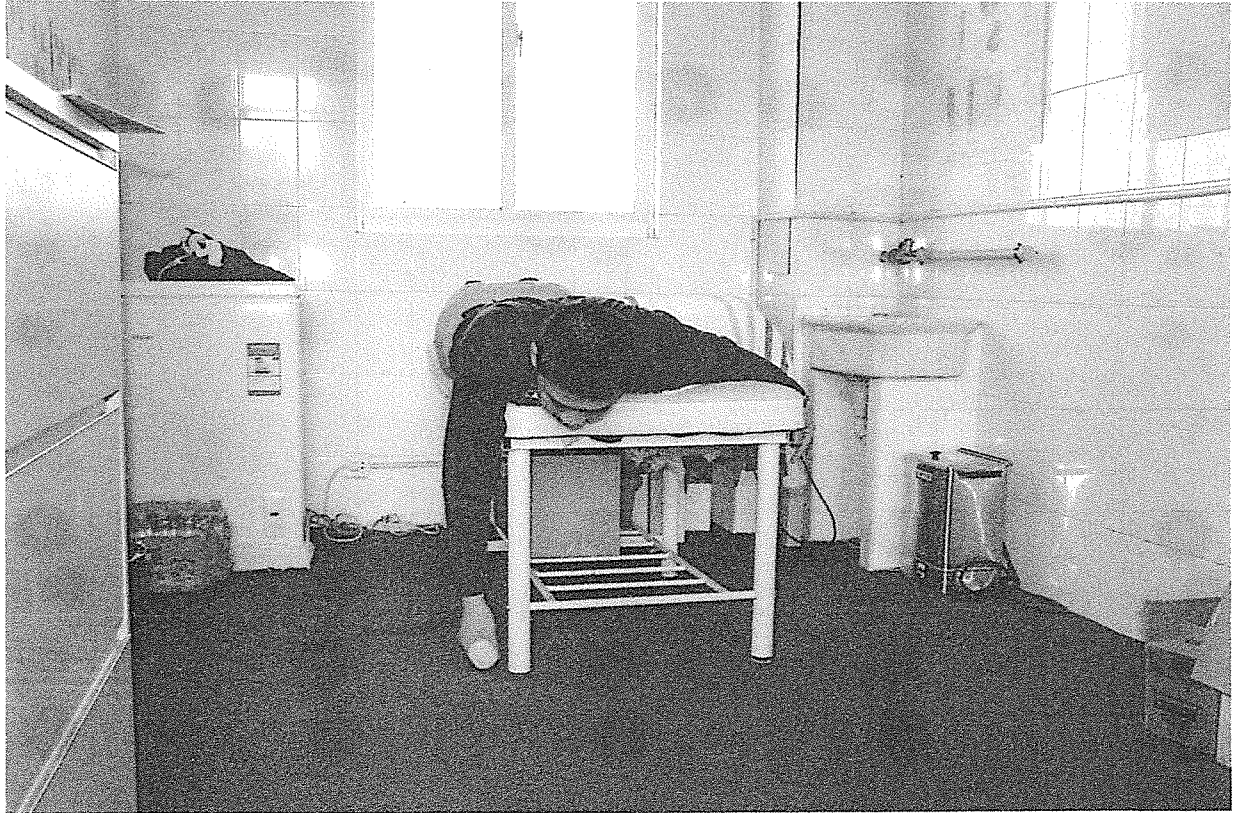
PRONE HORIZONTAL ABDUCTION

Thumbs Up



PRONE SKI JUMPERS

Throwing Arm only



SIDE LYING EXTERNAL ROTATION

