

Research Summary

Introduction and the problem of the research

The muscles work in pairs, so while a muscle or prime mover muscle contracts then the antagonistic muscle or prime mover muscles which are on the same joint relaxes not to prevent the movement, and when the moving limb reaches the final limit of the joint's range of motion, the muscle or prime mover muscles contracts a momentary contraction which correlates with the contraction strength for the prime mover muscles and the speed of the moving limb, also the balanced development at both of the joint sides between the prime mover muscles and the antagonistic muscles is the main path for preventing injuries.

Generally in the team games and specially volleyball, the prime mover muscles in the jumping skill are Quadriceps muscles, gluteal muscles and gastrocnemius muscle, and after a few months of specific training the muscles become more strengthened than the antagonistic muscles which are Scapula muscles, Hamstrings muscles and also the Back muscles. Because of this imbalance between these muscle groups, the player is exposed to a great deal of danger of injuries in the knee joint and soft tissues, such as the injuries of calcaneal tendon, hamstrings muscles tightness and the increased tightness in quadriceps muscles, in addition to the discomfort in low back muscles, therefore it is obvious that concentrating on the specific training is partly held responsible for the many injuries of the amblyopos muscle and tissues. So, the best way to prevent these injuries is through out developing a great deal of strength in all prime mover muscles at both sides of body joints.

So when all the muscles are strengthened, then the probabilities of exposing the player to injuries, which resulted from the imbalance developing of the muscles, are limited.

The researcher found big difference between the strength of the agonistic muscles and the antagonistic muscles which results in injuries for many players. So this difference led the researcher to conduct a program for improving the muscles imbalance in volleyball.

Aims of study:

- 1-Designing a training program for stretching and strengthening
- 2-Knowing the effect of stretching and strengthening program on muscle Balance.
- 3- knowing improving ratios of stretching , strengthening and moving ability

Hypothesis:

- 1-Muscle balance program improving muscular imbalance on strengthening knee joint muscles
- 2- Muscle balance program improving muscular imbalance on stretching joint muscles knee

The research method:

The research has used the experimental method by designing one group with pre and post measuring and other subsequent measures .

The research sample:

The research sample was selected with the purposive method from volleyball players in Zamalek club under 15 years who are registered from this season 1998-1999. The sample of the research consisted of 27 players.

The procedures:

- The physical level of the group was measured at the end of the preparation period of the previous season 1998-1999.
- Applying the pre – test.
- Conducting monthly measures to evaluate the program .
- Applying the post – test, after the program.
- Collecting data.

Conclusions :

- **Muscular balance between Anterior and posterior muscles :**
 - 1-strength ratio on knee flexion was 21:100 become now 30:100 .
 - 2-strength ratio on right knee flexion was 18:100 become now 21: 100.
 - 3-strength ratio on left knee flexion to right knee extension was 16:100 become now 21:100 .

- **Muscular balance on lateral body:**

1-strength ratio on right knee extension to left knee extension was 97: 100 become now 100: 100.

2-strength ratio on left knee flexion to right knee was 90:100 become now 100: 100.

3-strength ratio on right knee adduction to left knee adduction was 99: 100 become now 100: 100.

4-strength ratio on right knee abduction to left knee abduction was 99: 100 become now 100: 100.

- **Stretching balance between Anterior and posterior muscles :**

1-rang of motion ratio on knee flexion muscles to knee extension muscles was 53: 100 become now 67: 100.

2-rang of motion ratio on left knee flexion muscles to right knee extension muscles 35: 100 become now 66: 100.

- **Stretching balance on lateral body:**

1-rang of motion ratio on right knee extension muscles to left knee extension muscles 99: 100 become now 100: 100.

2-rang of motion ratio on right knee flexion muscles to left knee flexion muscles 99: 100 become now 100: 100.

- **Strength development ratio between Anterior and posterior muscles:**

1-Strength development ratio on knee extension muscles 57.47% less than knee flexion muscles 96.01%

2-Strength development ratio on left knee flexion muscles 105.5% more than knee extension muscles 68.28%

- **Strength development ratio on lateral body:**

1-Strength development ratio on right knee extension muscles 69.76% more than right knee extension muscles 68.28%

- **development ratio on rang of motion for Anterior and posterior muscles :**

- 1- development ratio on rang of motion for right knee extension muscles 62.34% to left knee more than right knee flexion muscles 14.19%
- 2- The rang of Strength development ratio between knee extension and knee flexion is 57.47% to 109%
- 3- NO injuries on the research sample in this season

Recommendations:

1. Equal deavlopmeant for knee agonistic and antagonistic muscles
2. Improving Strength development ratio on knee flexion muscles to become 100%: 100% with knee extension muscles.
3. Using the suggested training program of strength and flexibility to improve the muscular imbalance of the moving muscles in knee joint.
4. Putting on training muscular balance program within physical preparation program.
5. General season program must be included muscular imbalance program.
6. Paying attention to improve the muscular balance in the braves sport activates.
7. Helding symposiums on designing programs for improving the muscular imbalance of the moving muscle in different joints.
8. Using Isokinatic weight training machine for testing and training
9. Using similar muscular imbalance program for different muscles group.
10. Repeating the same research but by applying it another samples differing in age , sex (gender) , number and activity.
11. Studying the effect muscular balance program on technical performance.
12. Reprocedurcs this dissertation for the same muscles and another sample.

**THE EFFECT OF STRATCHING AND STRENGTHING
PROGRAM ON IMPROVING MUSCULAR IMBALANCE
ON KNEE JOINT MUSCLES**

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A DISSERTATION

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Partial Fulfillment of Requirement of
the Degree of Doctor of Philosophy

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