

## SPINE INJURIES IN RHYTHMIC GYMNASTICS AND METHODS OF THEIR REHABILITATION

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**Introduction.** Rhythmic gymnastics is a sport that combines the beauty and elegance of classical ballet with the strength and fitness of artistic gymnastics. Rhythmic gymnasts demonstrate extreme levels of flexibility and strength in performing their body work [1, 2]. Different techniques trained, hours of practice and competition demands will affect each gymnast differently, but some common technique faults predispose the gymnast to injury. Spine injuries are the most common injuries of the rhythmic gymnast.

Thus, the research **aim** is presentation of methods of rehabilitation, which help to avoid serious spine injuries. The main research task is to define the most common spine injuries in rhythmic gymnastics and describe methods, which help to avoid serious spine injuries.

**Methods** of research: literature analysis, comparative method and method of structural analysis.

**Results and discussion.** The USA study found that 52% of RG participants reported lumbar spine injuries. Thoracolumbar injuries occur in 41% RG participants. Cervical spine injuries occur very relatively - 7%. There is a 10-fold higher incidence of scoliosis in rhythmic gymnasts compared with another people.

**Lumbar spine.** The repeated extreme hyperflexion and hyperextension required for RG is associated with most of the lumbar spine disorders seen. Lumbar disc bulges are rare and it is more common to see facet joint dysfunctions. Lumbar spondylolysis also occur in rhythmic gymnasts. It is sometimes called the “gymnastics fracture” because it is associated with sports that require a lot of bending backward. Doing some exercises, lumbar spine pain will be relieve.

**Hamstring Stretch.** A passive exercise using little muscle effort. Lay on the floor with knees bent and feet on the floor. Find the neutral spine position and maintain it while slowly straightening one leg and lifting the heel toward the ceiling while supporting the back of the thigh with both hands. Hold for 10 to 30 seconds and repeat with other leg. Do 3 repetitions.

**Pelvic Tilt.** An active exercise from one position, where the abdominal muscles are isolated and used to move the spine. Lay on the floor with knees bent and feet flat on the floor. Tighten stomach muscle and pull the lower back to the floor. Hold for 10 seconds. Do 3 to 5 repetitions.

**Arm/Leg Raises.** A more dynamic exercise introduces movement of the arms and/or legs to challenge the neutral spine; Lie on one side with lower arm bent under head and upper arm resting with hand on floor near chest. Bend both knees and flex hips and find neutral spine position. Slowly raise upper leg 8 to 10 inches and lower. Do 5 to 10 repetitions and repeat on opposite side.

**Exercise Ball Bridges.** An advanced stabilization exercise that introduces unpredictable movement that must be responded to (the movement of the ball). Lay on floor with both feet propped up on the exercise ball with legs straight and arms relaxed to the sides. Find the neutral spine position and hold while slowly tightening the buttock muscle to lift the buttocks off the floor 2 to 3 inches.

**Thoracolumbar injuries.** Excessive loading of the thoracolumbar junction, thoracic stiffness and facet joint pathology as well as lower rib dysfunction and sacroiliac joint dysfunction are also associated with the thoracic hypokyphotic and lumbar hypolordotic posture commonly seen in rhythmic gymnasts. Performing exercises that strengthen your thoracolumbar fascia will improve your overall core strength, which can help safeguard against lower back injuries.

Bird Dog. Place knees and hands flat on the floor. Position hands shoulder-width apart and your knees hip-width apart. Keep back flat and parallel to the floor. Extend right arm forward and simultaneously lift and extend the left leg off the ground so both are parallel to the floor and in-line with your back. Hold this position for 30 seconds. Thoracolumbar fascia will have to support the position of raised arm and leg while maintaining balance on two limbs. Repeat the exercise with left arm and right leg to ensure training of the muscles is even.

The plank. The plank exercise targets thoracolumbar fascia and transverse abdominus muscles. These two muscles work in tandem to support body during the bridged portion of your lift. Start with forearms on the ground and extend legs back so that toes are on the ground but heels are in the air. This position will cause transverse abdominus and thoracolumbar muscles to contract to support body weight. Keep the position held 30 seconds or longer.

Superman. Get into a prone position, with chest and stomach flat on the floor. Arms and legs should be on the floor and extend away from body. Then lift arms, chest and thighs off of the floor six inches. Keep this position held for 30 seconds and then relax.

Scolioses. Scolioses often develop just prior to and during puberty. RG has been shown to be a very asymmetric sport, with skills practised and performed on the stronger side with far greater repetition than the weaker side. Gymnasts also tend to focus on stretching their more flexible side, and this leads to significant muscle imbalances and overloading of the spine.

Stretch Up and Reach Down. Stand with back against a wall, both arms dangling freely at your side. If the left side of back is your tight side, lift up left arm so that it's pointing straight toward the ceiling. Reach up toward the ceiling with left hand. At the same time, reach toward the floor with your right hand. Hold stretch for five seconds, then relax. Repeat stretch exercise a total of 10 times.

Side Stretch. This exercise is intended to stretch tight back muscles and provide with relief from symptomatic back complaints. Stand with feet about shoulder-width apart and your back against a wall, both arms dangling freely at your side. This is starting position. If the left side of back is your tight side, lift left arm above head and bend sideways to right, away from tight muscles. Put right hand on right hip to brace movement, and apply gentle pressure into right hip to augment your stretch. Reach over your head with left arm as far as you're capable of reaching. It is necessary to feel a gentle stretch in tight, left-sided back muscles and in the muscles between ribs. Hold stretch for five seconds before slowly returning to your starting position. Dumbbell Side Bends. Dumbbell side bends strengthen your weaker muscles at the side of your trunk. Do this exercise only on the side in which the scoliosis curve separates the shoulder and hip on the same side. First, hold a 5-lb. dumbbell with your hand opposite the over-stretched side; place feet slightly wider than shoulder-width apart and bend knees. Then, bend as far as comfortably possible to the side at which you are holding the dumbbell. Next, contract the muscles of the over-stretched side to raise trunk to an upright position. Repeat for three sets of 10 reps.

**Conclusions.** Rhythmic gymnasts are often more flexible than the average population and have greater passive joint range than active joint range, which results in joint instability and is associated with increased risk of injury. Injury prevention is better than treatment and correction of technique faults is paramount to treatment. Exercises must be as specific as possible so it helps to have some knowledge of skills and bodywork.

### References

1. Physical Therapy Health Center [Electronic resource]. – Access mode : <http://www.spine-health.com/treatment/physical-therapy>
2. Low Back Pain [Electronic resource]. – Access mode : <http://orthoinfo.aaos.org/topic.cfm?topic=A00311>

