

# UTILIZING STRENGTH AND CONDITIONING PRINCIPLES FOR A STRUCTURED UPPER BODY RESISTANCE TRAINING PROGRAM FOR A COMPETITIVE GYMNAST: A CASE REPORT

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## Introduction

- Gymnastics is a physically demanding sport that requires agility, flexibility, extreme total body strength, and intense upper body weight-bearing, therefore placing unusual forces across the upper extremity joints.
- The purpose of this case report was to demonstrate the effect of a resistance training program on a gymnast's upper body muscular strength and describes the benefits of implementing a structured strengthening program to be performed in conjunction with typical activities during a competitive gymnast's practice sessions over the course of eight weeks.
- A randomized control study should be performed to explore the potential effects of upper body resistance training programs within the gymnast population and therefore determine if muscular strength gains can contribute to injury prevention and enhanced performance of sport-related skills.

## Patient History/Systems Review

- The case participant was an eight year-old female competitive gymnast.
- Screening revealed no significant findings that would alter or influence her ability to participate in the specific exercise regimen.

## Examination



Figure 1A. Forearm Plank    Figure 1B. Chin Hold    Figure 1C. Bodyweight Push-Up

- Range of motion: within normal limits throughout all four extremities.
- Manual muscle testing revealed 5/5 strength in bilateral upper extremities, with the exception of shoulder flexion and abduction (4+/5 bilaterally).
- Three upper body functional activities performed: prone forearm plank, chin-hold, and push-up.

## Clinical Impression

- The case participant and her mother reported areas in which the participant could improve upon, particularly relating to the participant's ability to acquire gymnastics skills that are upper-body focused.
- It was hypothesized that the proposed resistance training program would have a positive effect in improved baseline functional strength and endurance measurements, thus supporting the use of sport-specific exercises to ultimately achieve gains in physical performance.

Table 2. Upper Body Resistance Training Weekly Routine

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	A	B	C	A	B	C
Active Rest Day	Biceps & Back	Shoulders & Core	Chest & Triceps	Biceps & Back	Shoulders & Core	Chest & Triceps

## Intervention

Table 3. Workout A: Biceps and Back

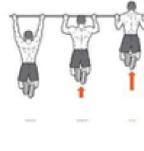
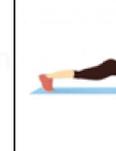
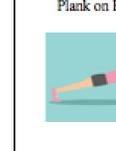
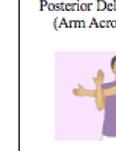
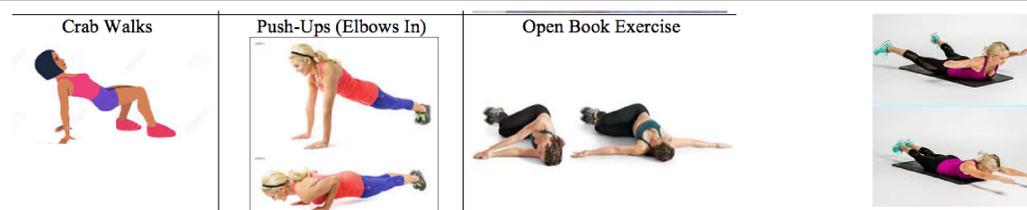
Warm-Up	Exercises	Cool-Down
Hanging Lateral Shifts on Uneven Bars 	Pull-Ups (Pronated Grip) 	Quadruped Cat-Cow 
Superman Lift 	Chin-Ups (Supinated Grip) 	Biceps Stretch 

Table 4. Workout B: Shoulders and Core

Warm-Up	Exercises	Cool-Down
Forward Arm Circles 	Plank on Elbows 	Lumbar Extension and Abdominal Stretch 
Backward Arm Circles 	Plank on Hands 	Posterior Deltoid Stretch (Arm Across Chest) 

- The exercise regimen for this participant consisted of a split-routine resistance training program that primarily focused on upper body strengthening, core strengthening, and dynamic stretching activities.
- The program was to be performed six days per week for eight weeks under supervision of the lead gymnastics coach. One day per week was designated as an active rest day, in which general daily physical activities and low-moderate intensity aerobic exercise could be performed.
- The program incorporated both open and closed-chain body movements that targeted large muscle groups, including the pectorals, deltoids, latissimus dorsi, rhomboids, triceps, and biceps.



References: See Handout with Reference List

## Outcomes

- The three functional movements of upper body muscular strength were measured prior to starting the training program, at the halfway point, and at following completion of the program.
- Midpoint screening was conducted in-person in order to determine how the participant was responding to the prescribed training program, as well as progress the volume or intensity of the exercises appropriately as needed.
- The training program resulted in improvements in the participant's muscular strength. The case participant also reported improvement in overall self-perception regarding acquisition and performance of gymnastics-related skills and routines during her practice sessions.

Functional Strength Measurement	Baseline Measurement	Completion Measurement
Push-Up	18 repetitions	35 repetitions
Forearm Plank	1 minute and 50 seconds	2 minutes and 21 seconds
90/90 Chin Hold	11 seconds	28 seconds

## Clinical Implications

- This case report describes the benefits of implementing a structured strengthening program to be performed in conjunction with typical activities during a competitive gymnast's practice sessions over the course of eight weeks.
- The resistance training program appeared to demonstrate a positive effect, as the participant made clear and consistent improvements in all strength and endurance measures that were assessed prior to implementing the program.
- Additional research will be necessary to further explore the potential benefits associated with a sport-specific upper body resistance training program within the young competitive gymnast population.

