

BACKGROUND

Resistance training is a valuable tool for physical development for all athletes hoping to prepare their bodies for the demands of sport. For youth athletes, resistance training can contribute to the development of foundational movement patterns, muscular strength, and muscular power.

However, measuring, assessing, and monitoring the volume of training in these populations may contribute to the field's knowledge of physiological adaptations to resistance training, periodization, and program design approaches. Furthermore, examining repetition volume by body region may be beneficial from a long-term athlete development standpoint.

PURPOSE

The purpose of this study was to quantify resistance training repetition volume of youth populations for upper, lower, and total body region exercises.

METHODS

- Resistance training volume characteristics from a university-based strength and conditioning program (Jayhawk Performance) for youth populations were calculated.
- Total repetitions completed each week and percent change between weeks were calculated for a resistance training program designed specifically for elementary and middle school aged youth.
- Upper body exercises included dumbbell bench press, hang clean, push-ups, and rows.
- Lower body exercises included squats, RDL's, landmine squats, step-ups, and sprints.

RESULTS

- Overall, similarities were observed between groups for general training structure which included upper and lower body exercises.
- However, repetition volumes differed between upper and lower body exercises.
- Furthermore, unique microcyclic characteristics were observed between groups. Although the general characteristics of the first two weeks of each resistance training program were similar between groups the final two weeks differed.
- An increase in repetition volume was programmed for elementary age groups during the third week, while it was decreased for middle school age groups.

Participation, competitiveness, and training intensity in youth sports continues to increase. This project aims to contribute to the growing body of knowledge and interest related to optimal strength and conditioning approaches for youth populations by examining resistance training volume characteristics specific to body regions.

Figures 1 and 2. Youth athletes performing a sprint (left) and a squat (right).



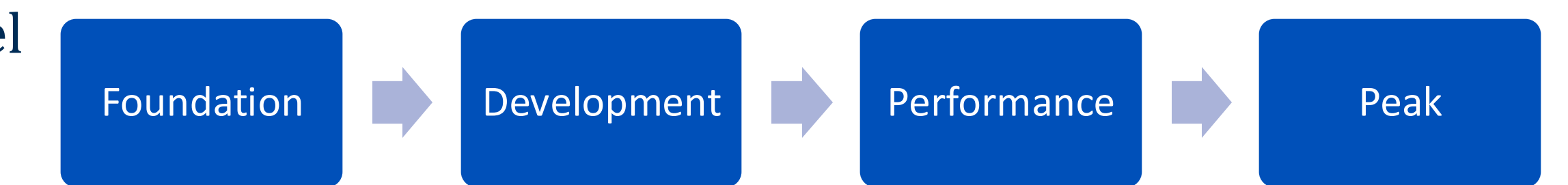
Table 1. Resistance training repetition volume characteristics by body region for elementary age groups.

Body Region	Week 1	Week 2	Week 3	Week 4	Average
Upper Body	100	100	140	80	105
Lower Body	120	120	160	80	120
Percent Change	-	0%	+36.6%	-46.5%	

Table 2. Resistance training repetition volume characteristics by body region for middle school age groups.

Body Region	Week 1	Week 2	Week 3	Week 4	Average
Upper Body	150	150	75	120	123.75
Lower Body	180	180	90	120	142.50
Percent Change	-	0%	-50.0%	+46.7%	

Figure 3. LTAD model proposed by Jeffries (2008).



CONCLUSIONS

- The present study's findings quantified the resistance training repetition volume characteristics by body region for youth populations.
- Unique differences between weeks and body regions were observed specifically in weeks three and four.
- However, repetition volumes between regions were similar throughout which may contribute to balanced physical development of youth participating in resistance training programs.

PRACTICAL APPLICATIONS

- Quantifying resistance training program characteristics for youth can be beneficial for further understanding and translating reasonable repetition volumes.
- Populations who have more resistance training experience typically utilize approaches that increase volume while decreasing intensity over time or decrease volume while increasing intensity over time in order to develop specific physical qualities.
- Future research should examine how resistance training volumes and intensities can be adapted over the long term to enhance physical development within youth populations.

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