repetition maximum. There was a 15 min rest interval after the first two bouts, a 105 min lunch break after bout three and a 15 min rest interval between bouts four and five. Serum CRP concentrations were determined before exercise (09:00 h), immediately after the last bout of exercise (15:30 h) and on the day after exercise (08:00 h, 11:00 h and 14:00 h) using a high sensitivity CRP assay. On the control trial participants were inactive and serum CRP was measured at corresponding times to the exercise trial.

RESULTS: Baseline serum CRP concentrations did not differ between trials (paired t-test, $P=0.149$) but the pattern of CRP response differed over time (repeated measures ANOVA, trial $\times$ time interaction, $P=0.028$) indicating elevated serum CRP post exercise (Table).

Table: Serum CRP concentrations (mg·L⁻¹) on a control and resistance exercise trial.

Time of day (h)	09:00 day 1	15:30 day 1	08:00 day 2	11:00 day 2	14:00 day 2
Control	1.54 $\pm$ 0.45	1.40 $\pm$ 0.39	1.07 $\pm$ 0.26	1.10 $\pm$ 0.26	1.09 $\pm$ 0.29
Exercise	0.83 $\pm$ 0.20	1.18 $\pm$ 0.51	1.37 $\pm$ 0.35	2.08 $\pm$ 0.81	1.73 $\pm$ 0.85

Mean $\pm$ SE, $n=9$.

CONCLUSION: High volume resistance exercise may lead to elevations in serum CRP concentrations. Further study is needed to determine if smaller volumes of resistance exercise produce a similar effect.

1778 Board #66 May 31 9:00 AM - 10:30 AM
General and Specific Strength Development Following Resistance Training in College Men and Women

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The benefits to be derived from using free weights versus machine weights in a resistance training program remain controversial. Recent investigations indicate that each form of training may have unique benefits at specific phases of strength development.

PURPOSE: to determine the amount of strength gain to be derived in the bench press using free weights and machine weights.

METHODS: College-aged men ($n=181$) and women ($n=259$) self-selected to train using free weights (FW, $n=165$), a seated horizontal chest press machine (HCP, $n=173$), or a supine vertical chest press machine (SCP, $n=102$). Participants were tested for general (free-weight) and specific (machine-weight) one-repetition maximum (1-RM) before and after training 3x/wk for 12 weeks using a general resistance program. Core lifts including the bench press followed a periodized program of 3 x 10-12-RM during the first 5 weeks, 3 x 6-8-RM during the next 4 weeks, and 3 x 3-5-RM during the final 3 weeks.

RESULTS: A gender $\times$ methods ANOVA revealed a significant interaction effect for general strength gain, with men making significantly greater improvements in FW (6.2 ± 5.2 kg) and HCP (6.0 ± 5.9 kg) than women (4.8 ± 4.4 and 3.9 ± 3.8 kg, respectively) and women making significantly greater improvement in SCP (5.6 ± 5.2 kg) than men (3.9 ± 4.6 kg). A gender $\times$ methods ANOVA produced a significant training method main effect for specific strength gain but no significant gender main effect or interaction effect. The HCP group made significantly greater improvement (11.7 ± 6.3 kg) than did the SCP group (9.1 ± 6.0 kg) which was significantly greater than the FW group (5.8 ± 5.0 kg).

CONCLUSION: Different methods of resistance training will produce different amounts of strength improvement in men and women. Measurement and training specificities may be operative during resistance training.

1779 Board #67 May 31 9:00 AM - 10:30 AM
Effects of Rest Duration Between Sets of Resistance Training on Hormonal Responses in Young Women

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PURPOSE: The purpose of this study was to examine the acute hormonal response to three different rest periods between sets of a traditional lower body resistance training session in young women.

METHODS: Twelve apparently healthy, resistance trained females (26.83 ± 3.93 yrs) participated in the study protocol. On three separate sessions of a lower body resistance exercise protocol, subjects were assigned in a random order a rest interval of either 30 (P30), 60 (P60) or 120 (P120) seconds between sets. The resistance exercise session consisted of four lower body exercises (bilateral knee extension, bilateral knee flexion, leg press, and squat) with 3 sets of 10 repetitions at 10-repetition maximum (RM) load. Blood samples were drawn for determination of serum growth hormone (GH) and cortisol concentrations before exercise (T0), immediately after each training session (T1), and 5 (T5), 15 (T15), and 30 (T30) minutes of recovery. Statistical evaluation of the data was measured using a 3 x 5 repeated measures analysis of variance [rest

interval (30, 60, and 120 s) $\times$ time (T0, T1, T5, T15, T30)]. The probability level of statistical significance was set at $p < 0.05$ in all comparisons.

RESULTS: There were no differences between protocols (P30, P60 and P120) in the serum GH and cortisol concentrations at baseline (T0). However, as compared to T0, all protocols led to acute increases ($p < 0.05$) in serum GH and cortisol concentrations after each training session. The GH concentrations between protocols were significantly higher for P30 (24.34 ng/ml) and P60 (23.07 ng/ml) as compared to P120 (17.13 ng/ml) at T1. The P30 GH concentrations were significantly higher at T5, T15, and T30 as compared to P60 and P120. The cortisol concentrations were significantly higher in P30 at T15 (452.02 nmol/L) and T30 (449.72 nmol/L) as compared to P60 (367.64 for T15, and 354.99 nmol/L for T30) and P120 (363.73 nmol/L for T15, and 346.02 nmol/L for T30).

CONCLUSIONS: Exercise-induced metabolic stress is associated with acute GH and cortisol responses following a typical hypertrophic resistance training session. The magnitude of acute hormonal responses in previously strength-trained women appears greater with a 30-second rest interval between sets compared to longer rest periods of 60- or 120-seconds.

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1780 Board #68 May 31 9:00 AM - 10:30 AM
Effect of Forced Repetitions on Maximal Squat Performance in a Nationally Ranked Junior Male Powerlifter

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PURPOSE: The purpose of this case study was to examine the effect of forced/assisted repetitions on the 1 repetition maximum (1 RM) squat capability of a highly trained, nationally ranked junior male powerlifter who had reached a training plateau after utilizing a linear periodization training program for eight months.

SUBJECT: The subject for this study was a 22 year old, highly trained, nationally ranked junior male powerlifter.

METHODS: Prior to implementation of the experimental training protocol, the subject's 1 RM in the squat was determined to establish baseline data. After a three day rest period the forced/assisted repetition protocol was implemented. On every experimental training session the subject's 1 RM in the squat was determined. After a 5-8 minute rest period the subject attempted five repetitions with his 1 RM + 25 lbs., utilizing the assistance of two training partners to enable successful completion of each repetition and to ensure safety. After a 5-10 minute rest period, the subject attempted to complete a second set of the same weight with a goal of three repetitions. After another 5-10 minute rest period, the subject attempted a third set of the same weight with a goal of two repetitions. This procedure was followed one day per week for six weeks. Three days after the sixth experimental training session the subject's 1 RM in the squat was determined for comparative purposes. While the experimental training protocol was implemented for the squat, the subject continued to utilize a linear periodization training program for both the deadlift and bench press training days.

RESULTS: The subject's 1 RM squat increased by 90 lbs. (15.5%) after six sessions of forced/assisted repetition training.

CONCLUSION: Based upon this case study it appears that forced/assisted repetitions can favorably affect the 1 RM squat capability of a highly trained, nationally ranked junior male powerlifter.

1781 Board #69 May 31 9:00 AM - 10:30 AM
Effects Of Strength Training And Chiropractic Therapy On Functionality In Women With Fibromyalgia

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PURPOSE: This study examined the effects of a strength training program (STR) and strength training combined with chiropractic therapy (STR-C) on functionality in women diagnosed with Fibromyalgia (FM).

METHODS: Participants (48 ± 9 yrs; mean $\pm$ SD) were randomly assigned to one of the following groups: STR ($n=15$) or STR-C ($n=12$). Both groups completed a 16-wk total body strength training program consisting of 10 exercises performed 2x/wk at 60-80% of their 1 repetition maximum (1-RM). In addition, STR-C received chiropractic therapy 2x/wk. Strength was measured using 1-RM for the chest press and leg extension exercises. Functionality was measured using the Continuous Scale Physical Functional Performance (CS-PFP) test that consists of tasks that simulate routine activities of daily living. Tasks range from sweeping to climbing a simulated bus while carrying groceries. The CS-PFP consists of 5 domains including upper body strength (UBS), upper body flexibility (UBF), lower body strength (LBS), balance and coordination (BALC), and endurance (END), as well as an overall score of functionality (CS-PFP). Intent-to-treat ANOVAs with repeated measures were used to compare groups before and after the intervention. Six participants discontinued the study, five from STR and one from STR-C.

RESULTS: There were no significant differences in the two groups for age, height, weight, the number of years individuals had been diagnosed with FM, or in baseline physical activity measured in steps/day. At the completion of the program both groups