



2020 NSCA COACHES CONFERENCE & LIVESTREAM



#Coaches20

CONFLICT OF INTEREST STATEMENT

I have no actual or potential conflict of interest in relation to this presentation.

FROM THE LAB TO YOUR WEIGHT ROOM: THE NEWEST RESEARCH YOU NEED TO KNOW

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RELATIONSHIPS BETWEEN JUMP AND SPRINT FORCE- VELOCITY PROFILES AND PERFORMANCE

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PURPOSE

- *TO INVESTIGATE THE ASSOCIATIONS BETWEEN MATCHED MECHANICAL VARIABLES DERIVED FROM BOTH VERTICAL¹ AND HORIZONTAL² FORCE-VELOCITY POWER (FVP) PROFILING, AND THE PERFORMANCE OUTCOME VARIABLES WITHIN SQUAT JUMP (SJ) AND SPRINT PERFORMANCE.*

METHODS

- 20 ELITE MALE ACADEMY RUGBY LEAGUE PLAYERS (AGE 17.6 ± 0.9 YEARS; HEIGHT 179.9 ± 6.6 CM; BODY MASS 91.2 ± 1.8 KG).
- DATA COLLECTION: THE PARTICIPANTS PERFORMED TWO MAXIMAL 40M SPRINTS. SPRINTS WERE RECORDED USING A RADAR GUN DEVICE (STALKER ATS II), WHICH OBTAINED INSTANTANEOUS SPEED-TIME MEASUREMENTS. SPRINT TIMES WERE DETERMINED FROM THE MODELLED VELOCITY-TIME DATA AT 2M, 5M, 10M AND 20M AND MAXIMUM VELOCITY (V_{MAX} ; M.S-1)
- THE PARTICIPANTS PERFORMED TWO MAXIMAL SJ ($\approx 90^\circ$ KNEE ANGLE) REPETITIONS WITH 0KG, 20KG, 40KG, 60KG AND 80KG. AN OPTOJUMP WAS USED TO RECORD JUMP HEIGHT (CM) FOR EACH LOAD.
- BODY MASS RELATIVE VERTICAL AND HORIZONTAL MECHANICAL VARIABLES (THEORETICAL MAXIMAL VALUES OF FORCE (F_0) (N/KG), VELOCITY (V_0) (M/S), POWER (P_{MAX}) (W/KG)) AND THE SLOPE OF THE F-V LINEAR RELATIONSHIP (SFV) WERE CALCULATED^{1,2}.

DATA ANALYSIS:

- *PEARSON'S CORRELATION COEFFICIENTS (R) ASSESSED THE RELATIONSHIP BETWEEN MATCHED VERTICAL AND HORIZONTAL MECHANICAL VARIABLES (F0 VERTICAL & HORIZONTAL, V0 VERTICAL & HORIZONTAL, PMAX VERTICAL & HORIZONTAL AND SFV VERTICAL & HORIZONTAL) AND SJ AND SPRINT PERFORMANCE.*

Table 1. Horizontal and vertical mechanical variables Mean \pm SD data.

	F0 (N/kg)	V0 (m/s)	Sfv (N.s/m/kg)	Pmax (W/kg)
HZT variable	7.31 \pm 1.04	8.7 \pm 0.54	-0.84 \pm 0.13	15.9 \pm 2.58
VTC variable	31.34 \pm 5.15	4.16 \pm 1.51	-8.8 \pm 4.42	31.51 \pm 9.6

Table 2. Performance variable Mean \pm SD data.

	Jump height (cm)	2m time (s)	5m time (s)	10m time (s)	20m time (s)	Vmax (m/s)
Performance variable	32.34 \pm 11.59	0.82 \pm 0.06	1.41 \pm 0.08	2.17 \pm 0.12	3.49 \pm 0.18	8.42 \pm 0.49

Table 3. Pearson correlation between matched mechanical variables

	F0 (N/kg)	V0 (m/s)	Sfv (N.s/m/kg)	Pmax (W/kg)
HZT & VTC	r=-0.19	r=0.15	r=-0.25	r=0.34

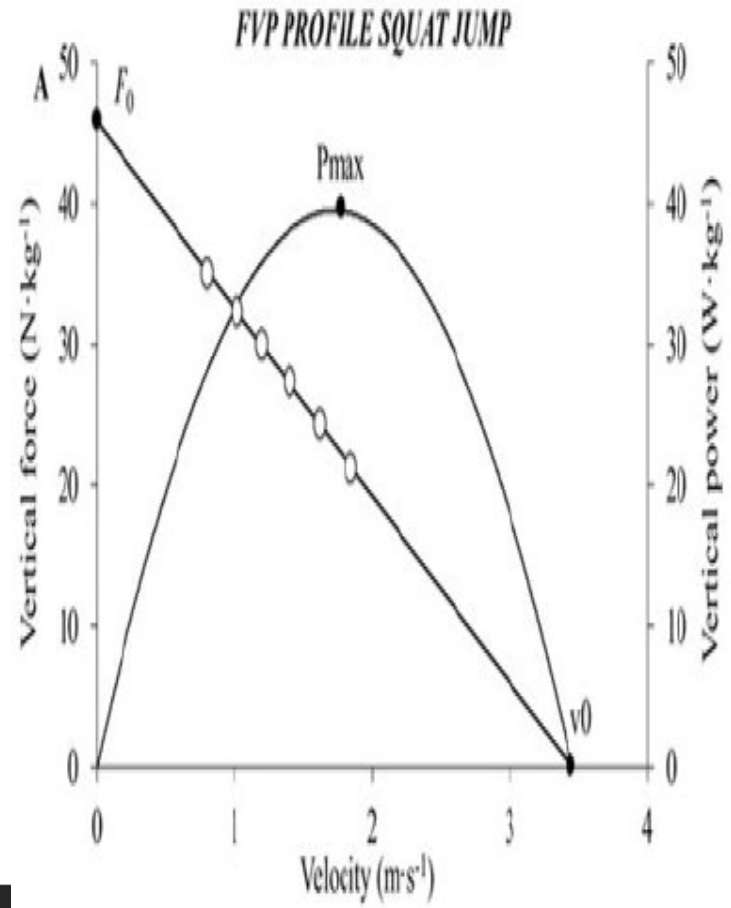
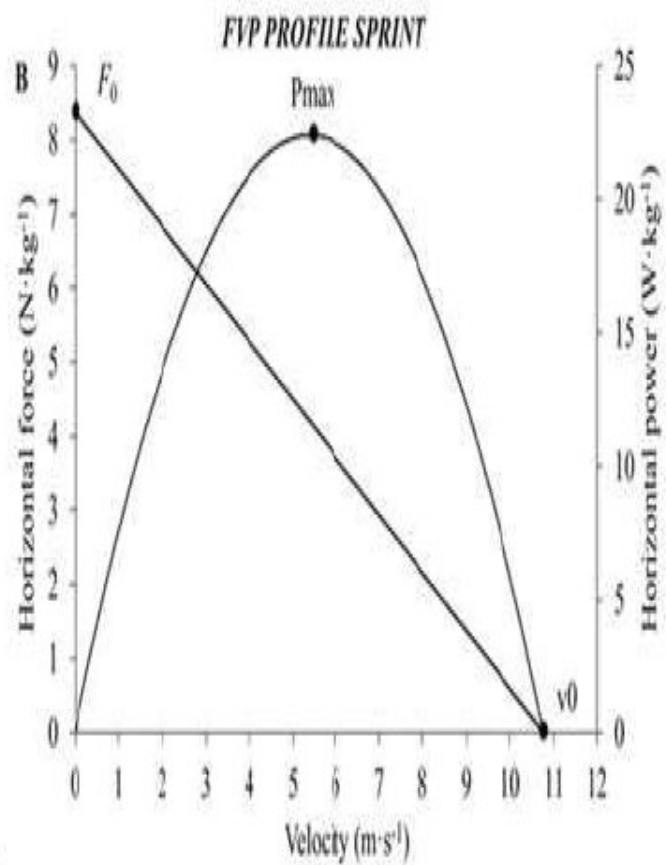
Table 4. Pearson correlation between HZT mechanical and performance variables

	HZT-F0 (N/kg)	HZT-V0 (m/s)	HZT-Sfv (N.s/m/kg)	HZT-Pmax (W/kg)
Jump height (cm)	r=-0.42	r=-0.25	r=-0.36	r=-0.43
2m time (s)	r=-0.98***	r=-0.22	r=0.83***	r=-0.94***
5m time (s)	r=-0.96***	r=-0.32*	r=0.78***	r=-0.96***
10m time (s)	r=-0.93***	r=-0.42*	r=0.71***	r=-0.98***
20m time (s)	r=-0.85***	r=-0.59***	r=-0.59***	r=-0.98***
Vmax (m/s)	r=0.17	r=1.0***	r=0.26	r=0.55***

Table 5. Pearson correlation between VTC mechanical and performance variables.

	VTC-F0 (N/kg)	VTC-V0 (m/s)	VTC-Sfv (N.s/m/kg)	VTC-Pmax (W/kg)
Jump height (cm)	r=-0.13	r=0.47*	r=0.41	r=0.51*
2m time (s)	r=0.16	r=-0.40	r=-0.27	r=-0.39
5m time (s)	r=0.19	r=-0.40	r=-0.28	r=-0.37
10m time (s)	r=0.17	r=-0.35	r=-0.25	r=-0.32
20m time (s)	r=0.21	r=-0.39	r=-0.30	r=-0.36
Vmax (m/s)	r=-0.05	r=0.17	r=0.12	r=0.16

Note: F0, theoretical maximal force; v0, theoretical maximal velocity; Pmax, theoretical maximal power; HZT, horizontal; VTC, vertical. *P < 0.05, **P < 0.01, ***p < 0.001.



RESULTS SUMMARY

- *THERE WAS NO SIGNIFICANT CORRELATION BETWEEN VERTICAL AND HORIZONTAL FVP MATCHED MECHANICAL VARIABLES ($P > 0.05$).*
- *THE CORRELATIONS BETWEEN VERTICAL FVP VARIABLES AND SPRINT PERFORMANCE AND BETWEEN HORIZONTAL FVP VARIABLES AND SJ PERFORMANCE FAILED TO REACH STATISTICAL SIGNIFICANCE ($P > 0.05$).*
- *MODERATE -0.32 TO NEAR PERFECT 1.0 SIGNIFICANT CORRELATIONS ($P < 0.05$) WERE FOUND BETWEEN MECHANICAL AND PERFORMANCE VARIABLES SHIFTING THE IMPORTANCE OF SEPARATE VARIABLES DEPENDING ON THE TESTING TASK.*

CONCLUSIONS

- *THE ABSENCE OF SIGNIFICANT CORRELATIONS BETWEEN THE VERTICAL AND HORIZONTAL FVP PROFILES SUGGESTS THAT THEY PROVIDE DISTINCTIVE INFORMATION ABOUT THE ATHLETE'S MECHANICAL VARIABLES.*
- *THE MAGNITUDE OF THE CORRELATIONS BETWEEN MECHANICAL VARIABLES AND SPRINT PERFORMANCE SHIFTED ACROSS THE VELOCITY-TIME CURVE, THEREFORE PERFORMANCE IS DETERMINED BY SEPARATE QUALITIES DEPENDING ON THE DISTANCE.*
- *WHEREAS, P_{MAX} REPORTED THE GREATEST CORRELATION WITH SJ HEIGHT.*

PRACTICAL APPLICATIONS

- *TO ENSURE SPECIFIC, ACCURATE AND COMPREHENSIVE CHARACTERIZATION OF ATHLETES' PHYSICAL QUALITIES FVP PROFILES SHOULD BE DETERMINED WITH EXERCISES MAXIMAL MECHANICALLY SIMILARITY TO THE TARGETED PERFORMANCE TASK.*
- *THESE RESULTS WILL AID PRACTITIONERS IN TEST SELECTION THE PRESCRIPTION AND INDIVIDUALIZATION OF TRAINING BY PROVIDING IMPORTANT INFORMATION AS TO THE MOST INFLUENTIAL VARIABLES TO DEVELOP SJ AND SPRINT PERFORMANCE.*

MY TAKEAWAYS

- SAID PRINCIPLE IN ACTION
- TRAIN THE FORCE VECTOR NECESSARY
 - Horizontal and vertical forces are of different magnitude and peaking times in the same movement (see video on next slide)
- TEST EACH VARIABLE THAT MATTERS
- INVESTIGATE TRANSFER INDEXES (RESULT GAIN SPRINT/RESULT GAIN EXERCISE)
 - If it no longer transfers, find something else

FROM KEN CLARK ON TWITTER



PREDICTION OF BAT SWING VELOCITY FROM SPRINT SPEEDS AND DISCRETE VARIABLES OF THE COUNTERMOVEMENT JUMP IN NCAA DIVISION 1 SOFTBALL

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INTRODUCTION

- *A PRIMARY REQUIREMENT FOR SCORING RUNS IN SOFTBALL IS BEING ABLE TO HIT THE BALL. GIVEN THE SPEED OF MOST PITCHES, THE ABILITY TO GENERATE SPEED IN THE BAT SWING WOULD APPEAR TO BE ONE OF THE MAJOR COMPONENTS OF HITTING THE BALL.*

PURPOSE

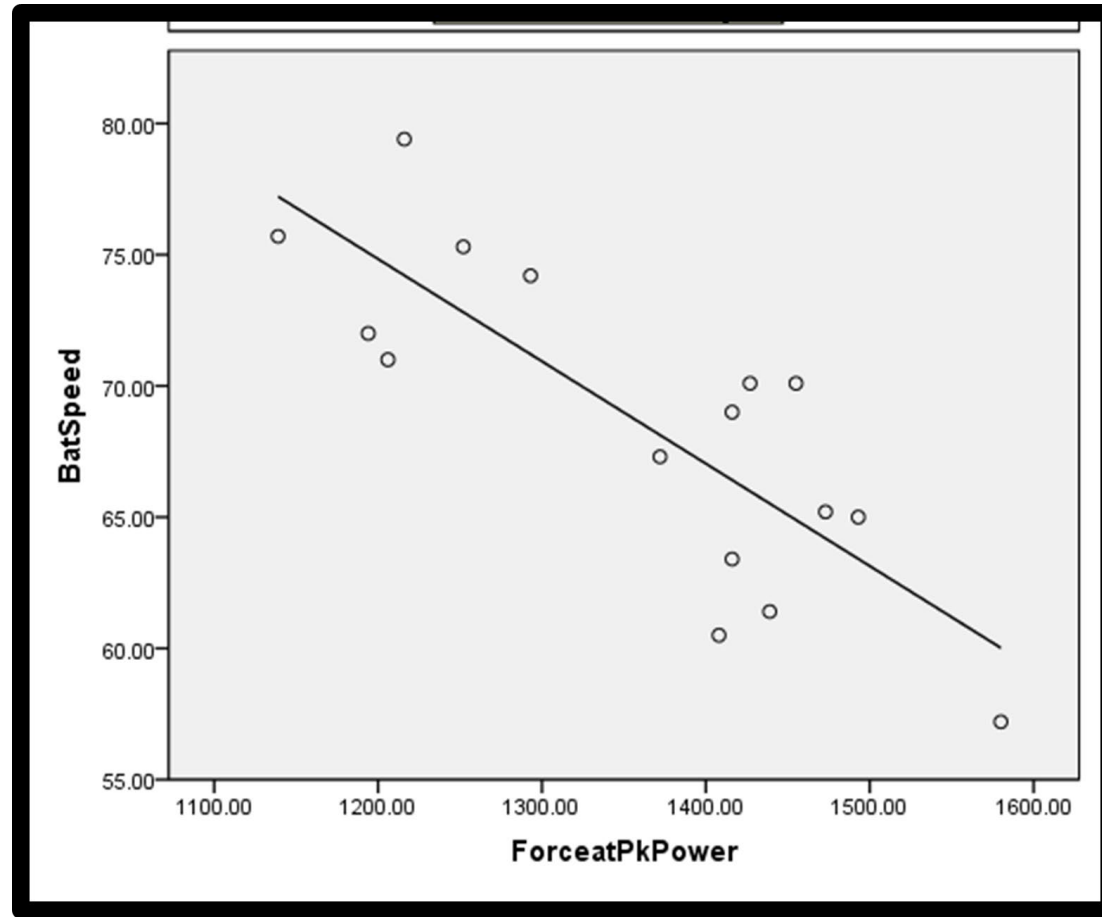
- *THE PURPOSE OF THIS STUDY WAS TO DETERMINE THE ABILITY TO PREDICT BAT VELOCITY FROM COMMONLY UTILIZED DISCRETE VARIABLES OF THE COUNTERMOVEMENT JUMP.*

METHODS

- *MEMBERS OF AN NCAA DIVISION 1 SOFTBALL TEAM (N = 22, AGE= 19.05 ± 1.16 YRS, HEIGHT = 170.2± 6.3 CM, BODY MASS = 66.86 ± 9.91 KG) WERE MEASURED*
- *THE COUNTERMOVEMENT JUMP (CMVJ) ON A SINGLE-AXIS DUAL-FORCE PLATFORM SYSTEM SAMPLING AT 1000 HZ. PLAYERS PERFORMED THE JUMPS WITH THEIR HANDS ON THEIR HIPS. TWO JUMPS WERE PERFORMED WITH A QUIET STANDING PERIOD BETWEEN THEM.*
- *THE SPRINT WAS TIMED ELECTRONICALLY WITH THE START FROM A 3-POINT STANCE ACTIVATED BY A TOUCH PAD AND THE FINISH DETERMINED BY INFRARED SENSORS.*
- *BAT VELOCITY (BV) WAS RECORDED USING A PREVIOUSLY VALIDATED COMMERCIALY AVAILABLE ACCELEROMETER THAT ATTACHED TO THE PROXIMAL END OF THE BAT. THE AVERAGE OF 8 SWINGS WAS USED TO ESTIMATE BV*

RESULTS

- *BACKWARDS ELIMINATION REGRESSION USING CMVJ AND SPRINT TIMES WERE USED TO ESTIMATE BV.*
- *FORCE AT PEAK POWER (FPP) WAS THE ONLY VARIABLE SELECTED TO PREDICT BAT VELOCITY.*
- *THE REGRESSION EQUATION DERIVED THE FOLLOWING EQUATION:*
 - $BV = 121.625 - FPP \times 0.039$
($R=0.81, R^2=0.656, F=26.742, SEE= 3.77, p=0.000$)



CONCLUSIONS

- *THESE RESULTS SUGGEST THAT A SOFTBALL PLAYERS BAT VELOCITY IS PREDOMINANTLY DEPENDENT ON HER ABILITY TO GENERATE FORCE QUICKLY.*

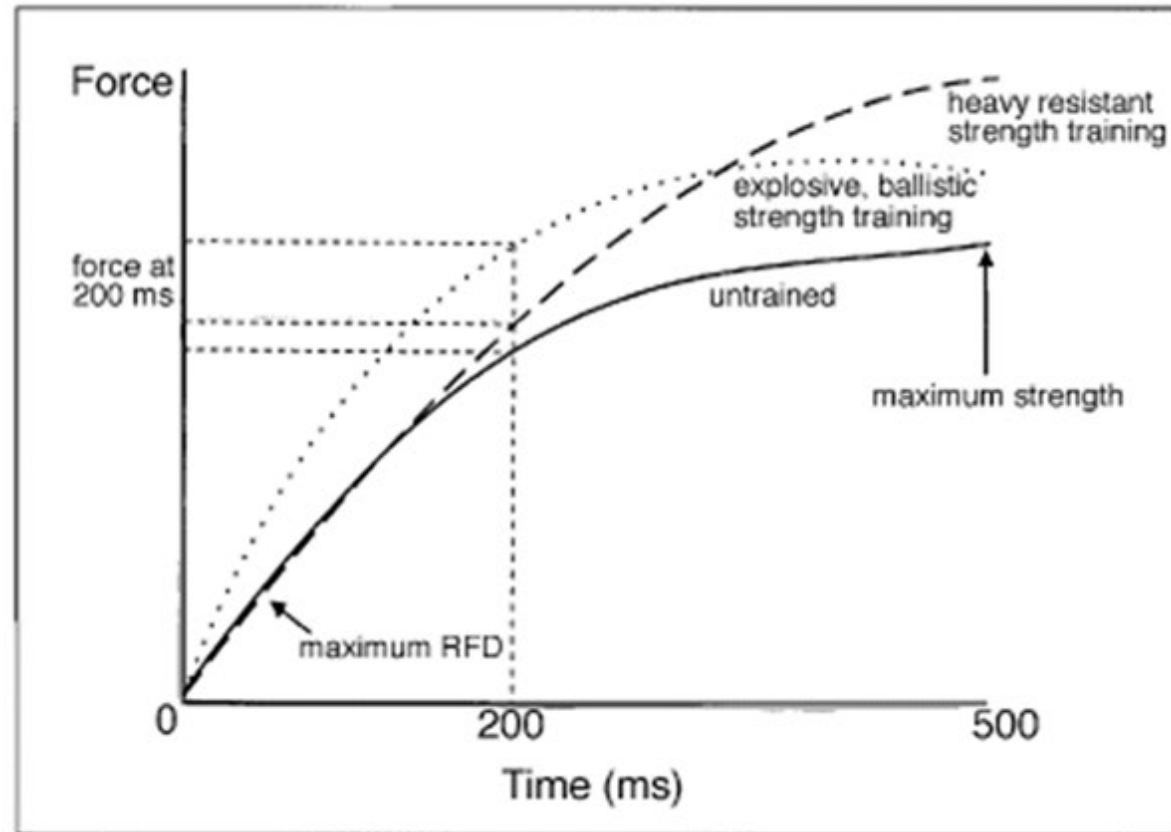
PRACTICAL APPLICATION

- *THE FINDINGS IN THIS STUDY SUGGEST THE POTENTIAL OF INCREASING BV BY INCREASING LEG STRENGTH AND/OR LEG POWER IN SOFTBALL PLAYERS.*
- *A LONGITUDINAL STUDY IS NECESSARY TO VALIDATE THIS SUPPOSITION.*

MY TAKEAWAY

- *THIS SUPPORTS THE WORK OF BOTH SZYMANSKI AND HAKKINEN AND KRAEMER*
- *YOU NEED TO BE STRONG, BUT YOU NEED TO BE STRONG FAST AS THERE IS A LIMITED TIME TO EXERT FORCE.*
- *SO IT'S NOT JUST STRENGTH, BUT POWER THAT NEEDS TO BE THE FOCUS OF TRAINING.*

KRAEMER AND HAKINNEN GSSI 53



**PREDICTION OF BAT SWING VELOCITY FROM SPRINT SPEEDS AND DISCRETE VARIABLES OF THE
COUNTERMOVEMENT JUMP IN NCAA DIVISION 1 SOFTBALL**

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INTRODUCTION

- *CHANGE OF DIRECTION ABILITY IS A FUNDAMENTAL COMPONENT OF AMERICAN FOOTBALL AND IS TYPICALLY A FACTOR SEPARATING GOOD PLAYERS FROM AVERAGE ONES.*
- *PREVIOUS INVESTIGATIONS HAVE NOTED DIFFERENCES IN “AGILITY” TESTS PERFORMED ON DIFFERENT PLAYING SURFACES.*
- *HOWEVER, FEW STUDIES HAVE BEEN DONE TO ASSESS THE FACTORS WHICH MAKE THE BIGGEST CONTRIBUTE TO GOOD AGILITY ON DIFFERENT ARTIFICIAL TURFS.*



- *AGILITY IS THE CHANGE OF DIRECTION/SPEED IN RESPONSE TO A STIMULUS.*
- *MOST “AGILITY” TESTS HAVE NO STIMULUS, AND THUS AREN’T AGILITY, THEY ARE CHANGE OF DIRECTION.*

PURPOSE

- *THE PURPOSE OF THIS STUDY WAS TO ASSESS THE CONTRIBUTION OF SELECT TEST VARIABLES TO EXPLAIN PROAGILITY PERFORMANCE ON DIFFERENT TURF SURFACES IN COLLEGE FOOTBALL PLAYERS.*

METHODS

- *MEMBERS OF AN NCAA DIVISION 1 FOOTBALL TEAM OVER THE COURSE OF 15 YEARS WERE UTILIZED VIA ARCHIVAL DATA.*
- *464 NCAA DIVISION I PLAYERS (AGE = 18.1 ± 0.5 YRS, HEIGHT = 185.1 ± 6.5 CM, BODY MASS = 101.1 ± 18.4 KG, BMI = 29.3 ± 4.3 KG/M²)*
- *ONLY THEIR INITIAL TEST TO EVALUATE BASIC ATHLETIC ABILITY WAS UTILIZED.*
- *DURING THAT TIME, TWO DIFFERENT ARTIFICIAL TURFS WERE USED WHEN ASSESSING PLAYERS (TURF 1, N = 227, TURF 2, N = 237).*
- *THE PROAGILITY TEST (PA) WAS HAND-TIMED BY TWO CSCS COACHES, AND THE AVERAGE USED FOR ANALYSIS (4.42 ± 0.27 S).*
- *THE 40-YD SPRINT (SP) WAS MEASURED ELECTRONICALLY AND CONVERTED TO A HAND TIME BY SUBTRACTING 0.25 SEC (4.84 ± 0.32 S).*
- *MAXIMUM SQUAT WAS ESTIMATED FROM A 2-5RM TEST USING THE BRZYCKI EQUATION AND WAS EXPRESSED RELATIVE TO BODY MASS (SQ/KG).*

RESULTS

- TURF 1 HAD A SIGNIFICANTLY FASTER PA TIME (4.38 ± 0.27 S) COMPARED TO TURF 2 (4.44 ± 0.27 S), BUT THERE WAS NO SIGNIFICANT DIFFERENCE BETWEEN SP TIMES (4.84 ± 0.31 S AND 4.83 ± 0.33 S, RESPECTIVELY).
- BACKWARD ELIMINATION REGRESSION ON EACH TURF SAMPLE SELECTED SP, BMI, AND SQ/KG TO PREDICT PA WITH EQUAL EFFECTIVENESS FOR TURF 1 ($R = 0.85$, $SEE = 0.14$ S, $CV = 3.2\%$) AND TURF 2 ($R = 0.87$, $SEE = 0.13$ S, $CV = 2.9\%$).
- IN THE TURF 1 EQUATION [$PA (S) = 0.443 SP + 0.014 BMI - 0.156 SQ/KG + 2.14$], SP HAD THE BIGGEST IMPACT ON THE PREDICTION (75%), WITH BMI (14%) AND SQ.KG (11%) ADDING COMPARABLE AMOUNTS.
- IN THE TURF 2 EQUATION [$PA (S) = 0.546 SP + 0.008 BMI - 0.081 SQ/KG$], SP HAD A BIGGER IMPACT ON THE PREDICTION EQUATION (94%), WITH BMI (3%) AND SQ.KG (3%) ADDING ONLY SMALL AMOUNTS.
- BACKWARDS ELIMINATION REGRESSION USING CMVJ AND SPRINT TIMES WERE USED TO ESTIMATE PA.

CONCLUSIONS

- *PA TIME IS INFLUENCED IN ALL FOOTBALL POSITIONS LARGELY BY SP ABILITY, WITH BODY SIZE AND LEG STRENGTH MAKING MINOR CONTRIBUTIONS TO PERFORMANCE PREDICTION REGARDLESS OF PLAYING SURFACE.*

PRACTICAL APPLICATION

- *GIVEN THE LIMITS ON IMPROVING INNATE RUNNING SPEED, STRENGTH AND CONDITIONING SPECIALISTS MIGHT CONSIDER CONCENTRATING TRAINING ON INCREASING LEG STRENGTH WHILE MAXIMIZING BODY COMPOSITION ALTERATIONS TO ENHANCE AGILITY IN COLLEGE FOOTBALL PLAYERS.*
- *FURTHER RESEARCH SHOULD FOCUS ON THE IMPACT OF DIFFERENT TRAINING PROGRAMS TO IMPROVE AGILITY IN PLAYERS AT DIFFERENT POSITIONS.*

MY TAKEAWAY

- *IF YOU'RE OUTSIDE OF THE NORMS, LOOK AT TECHNIQUE AND BIOMECHANICAL LIMITATIONS, BODY COMPOSITION, ETC.*



The Effect of 5% Difference in Training Intensity on Strength Gains in Collegiate Football Players

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INTRODUCTION

- AMERICAN FOOTBALL PLAYERS HAVE AN INCREASED NECESSITY FOR STRENGTH, WITH BENCH PRESS (BP), POWER CLEAN (PC), AND BACK SQUAT (BS) CONSIDERED FOUNDATIONAL EXERCISES, AND USED FOR EVALUATION (1).
- AN AVERAGE INTENSITY OF 80% IS CONSIDERED OPTIMAL (2) FOR DEVELOPING STRENGTH IN ATHLETES; 85% REQUIRED TO DEVELOP MAXIMAL STRENGTH (3).
- HOWEVER, FEW STUDIES INVESTIGATE THE USE OF SPECIFIC INTENSITIES TO DETERMINE TRAINING OUTCOMES.
- RESEARCH INDICATES THAT OVER EXPOSURE TO MAXIMAL TRAINING, AND LONG TERM EXPOSURE TO HIGH INTENSITIES CAN LEAD TO ILLNESS (4), INJURY (5), AND CAN DECREASE STRENGTH LEVELS (6).
- THE ROLE OF THE S&C COACH SHOULD BE TO PRESCRIBE AN INTENSITY THAT ALLOWS FOR GRADUAL ADAPTATION, INCREASES PERFORMANCE, WHILST MINIMIZING FATIGUE.

PURPOSE

- *PURPOSE: TO DETERMINE THE EFFECT OF TRAINING AT AN INTENSITY DIFFERENCE OF 5% OVER THE COURSE OF A 12-WEEK OFF-SEASON ON 1RM STRENGTH IN COLLEGIATE FOOTBALL ATHLETES. THIS INFORMATION COULD HELP DIRECT BETTER PRACTICE FOR S&C COACHES AND BENEFIT ATHLETES.*

METHODS

- *8 COLLEGIATE FOOTBALL PLAYERS VOLUNTEERED TO PARTICIPATE*
- *PRE-TEST ANTHROPOMETRICS AND 1RM BP, PC, BS WERE PERFORMED*
- *PARTICIPANTS WERE PAIR MATCHED BASED ON POSITION GROUP AND 1RM STRENGTH*
- *THEY WERE RANDOMLY ASSIGNED TO ONE OF TWO TRAINING GROUPS THAT TRAINED AT AN AVERAGE INTENSITY OF 80% (HIGH) OR 75% (LOW)*
- *PARTICIPANTS WERE BLINDED TO GROUP ASSIGNMENT AND TRAINED FOR 12 WEEKS ON MON/WED/FRI*
- *AN UNDULATED PERIODIZATION WAS USED AND TRAINING SESSIONS WERE ORGANIZED USING THE TIER SYSTEM*
- *SET/REP AND INTENSITIES FOR BOTH GROUPS CAN BE FOUND IN TABLE 1 AND TABLE 2*
- *1RM POST-TESTING WAS COMPLETED*
- *REPEATED MEASURES ANOVA WAS USED TO OBSERVE CHANGES IN STRENGTH*
- *INDEPENDENT T-TEST WAS USED TO ANALYZE DIFFERENCES IN VOLUME LOAD*

RESULTS

- *BOTH GROUPS SIGNIFICANTLY INCREASED THEIR STRENGTH*
 - $p < 0.0001$, $F = 31.0$, $ES = 0.762$
- *BENCH PRESS SIGNIFICANTLY IMPROVED IN BOTH GROUPS*
 - $p < 0.0001$, $F = 26.1$, $ES = 0.457$
- *POWER CLEAN SIGNIFICANTLY IMPROVED IN BOTH GROUPS*
 - $p < 0.0001$, $F = 53.6$, $ES = 0.634$
- *THERE WERE NO GROUP DIFFERENCES OBSERVED*
- *THE HIGH INTENSITY GROUP LIFTED MORE WEIGHT OVERALL, IN THE BP, PC, AND BS*
 - Overall: $p = 0.108$, $F = 0.001$, $d = 0.48$
 - PC: $p = 0.054$, $F = 0.006$, $d = 0.66$

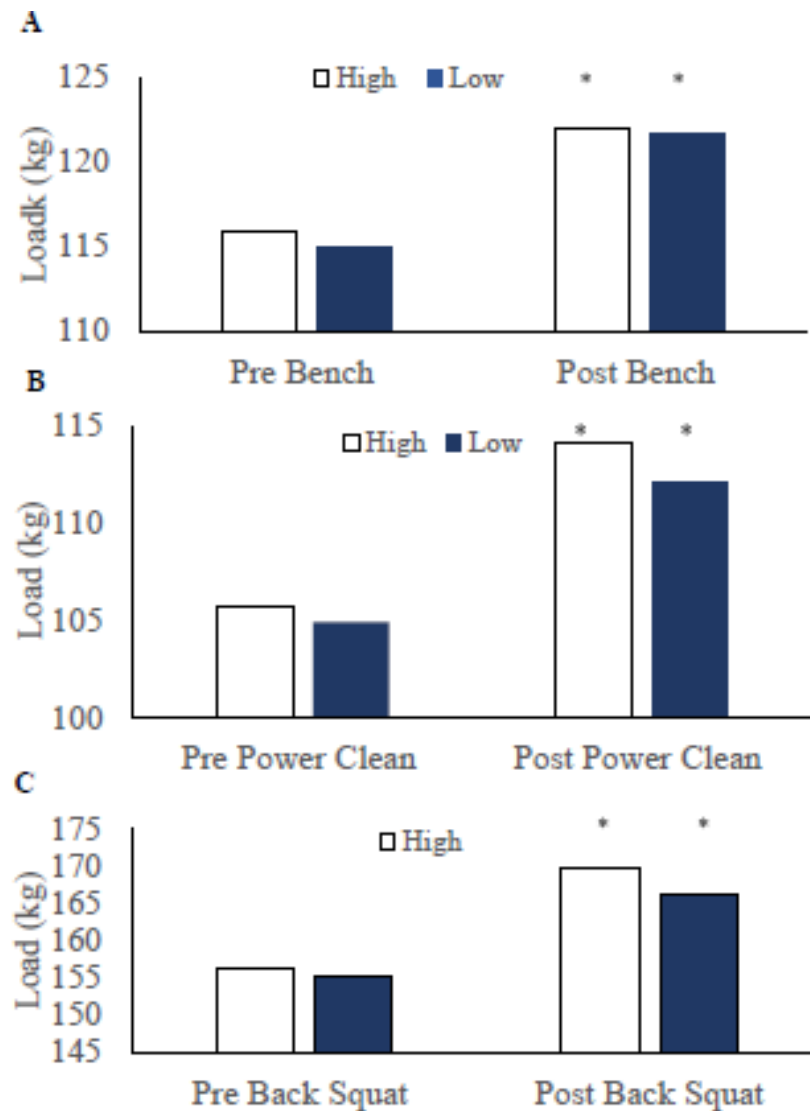


Figure 1: A) Mean bench press, B) power clean, and C) back squat 1RM changes pre-post a 12-week training intervention involving a 5% difference in training intensity. *Denotes significant difference from pre-training values ($p < 0.0001$)

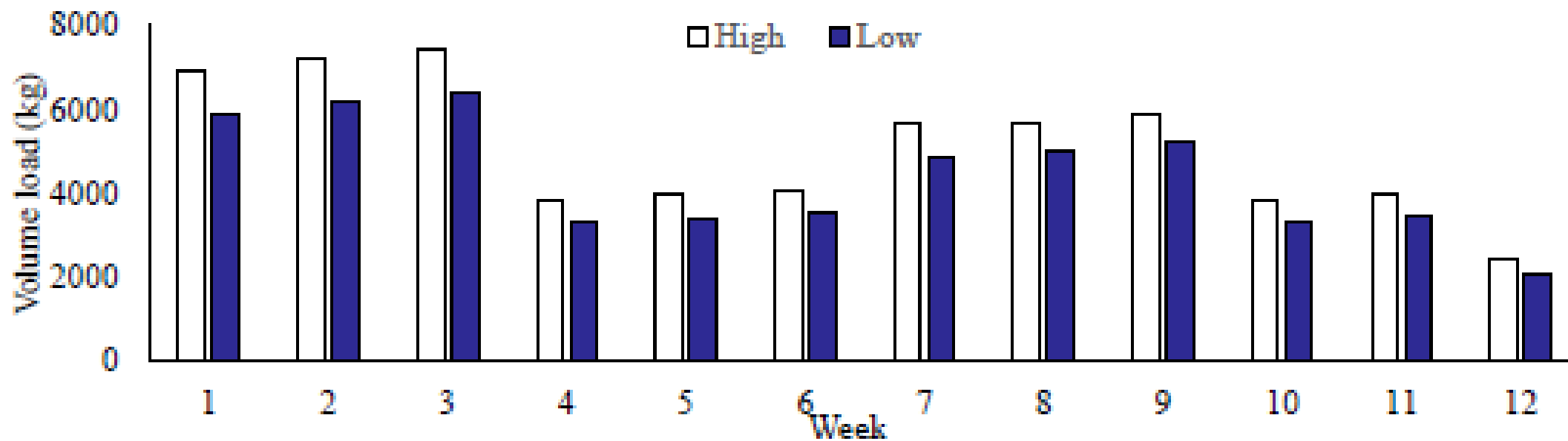


Figure 2. Total mean (\pm SD) weekly volume load differences during a 12-week intervention.

CONCLUSION

- TRAINING AT AN AVERAGE OF INTENSITY OF EITHER 80% OR 75% INCREASED STRENGTH GAINS IN THIS POPULATION. THIS SUGGESTS THAT TRAINING AT A LOWER INTENSITY CAN PRODUCE SIMILAR RESULTS TO THE TRADITIONAL GUIDELINES.
- LOW INTENSITY GROUP MADE SIMILAR STRENGTH GAINS DESPITE LIFTING LESS LOAD, AND NOT EXCEEDING 82.5% IN BP, BS. THIS SUGGESTS THAT INTERMEDIATELY TRAINED ATHLETES CAN IMPROVE MAXIMAL STRENGTH DESPITE TRAINING LIGHTER THEN RECOMMENDED GUIDELINES OF 85% 1RM
- LOWER INTENSITY COULD ALLOW FOR GRADUAL ADAPTATION, DECREASED STAGNATION, AND LOWER RISK OF OVERTRAINING, WHICH CAN BE POSITIVE FOR THE ATHLETES.
- THESE RESULTS RAISE QUESTIONS ABOUT WESTERN PERIODIZATION PHILOSOPHIES IN CURRENT JOURNAL ARTICLES COMPARED TO A LIGHTER APPROACH SEEN IN THE EAST.
- HIGHLIGHTS QUESTIONS OF THE NECESSITY OF APPLYING A MODEL THAT REQUIRES TAPERING; INSTEAD A COACH COULD IMPLEMENT A GRADUALLY INCREASING LONG TERM PLAN.
- INTERESTINGLY, AMONGST STRONGEST ATHLETES, RESULTS FAVORED THE LOW INTENSITY GROUP
- SECONDARY AND ASSISTANCE LOADS WERE NOT CONTROLLED FOR.
- IN THE FUTURE, IT WOULD BE INTERESTING TO INVESTIGATE THE IMPACT OF A SMALL DROP IN INTENSITY ON RPE, PHYSIOLOGICAL MARKERS, SPEED, AND VERTICAL JUMP

PRACTICAL APPLICATIONS

- *S&C COACHES CAN TRAIN FOOTBALL ATHLETES 5% LIGHTER DURING AN OFF-SEASON AND GAIN SIMILAR STRENGTH.*
- *DECREASED VOLUME LOAD COULD HELP LIMIT STAGNATION AND OVERTRAINING.*
- *PROVIDES S&C COACHES WITH EVIDENCED BASED VOLUME AND INTENSITY PRESCRIPTIONS FOR INTERMEDIATELY TRAINED ATHLETES.*

MY TAKE AWAYS

- *MAXIMAL IS NOT ALWAYS BETTER*
- *SUBMAXIMAL MAY ALLOW BETTER ADAPTATION TO THE PROGRAM*
- *WORRYING ABOUT SMALL FLUCTUATIONS IN THE AVERAGE WEIGHT OF THE BAR IS UNNECESSARY.*

PRESENTATION CONCLUSION:

- *THIS IS NOT HARD TO DO, GET WITH A PROFESSOR ON CAMPUS OR SPEAK TO A PHD HERE AT THE CONFERENCE.*
- *IF THERE IS SOMETHING YOU ARE WANTING TO SEE DONE IN RESEARCH IN ATHLETES, YOU NEED TO DO SOMETHING ABOUT IT*
- *DON'T BE AFRAID TO PUSH THE ENVELOPE. AS COACHES, WE'RE RUNNING IN CIRCLES*
 - “If you tell me what it is, I'll tell you what we used to call it,”- Bob Alejo
- *THE FASTEST WAY TO MOVE FORWARD IS TO WORK TOGETHER AS COACHES, AND ACADEMICS.*
- *IT'S OK TO BE WRONG, IT'S NOT OK TO BE STAGNANT*

THANK YOU

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