Dynamic Muscle Tension Training
and
It's Ability
to
Condition & Strengthen the Body

by

Allen D. Lee

EXS 494

Dr. Norman A. Kaluhiokalani

28 March 2001

"Abstract"

The purpose of this study was to test whether or not Dynamic Muscle Tension Training can be a valid and effective approach in increasing a person's muscle strength, increasing muscle girth, losing weight, and decreasing resting heart rate. The study consisted of three 30-minute exercise sessions per week using specified guidelines for warming up, flexibility, cooling down, movement, duration, and intensity for a period of 5 weeks. Results derived from this study were based on scores of several paired-sample t-tests at a 95% confidence level. This study concluded that persons of various ages and body types can considerably increase muscle strength, increase muscle girth, possibly lower resting heart rate, however, cannot necessarily lose weight within the limitations of the study.

"Chapter I"

<u>Introduction</u>:

For centuries', whether from ancient Greece or the Dynasties of China, it has been known that in order to have a strong body for success in athletics or war, the body must be trained so that the muscles are conditioned for battle, in order to maintain high performance, and balanced fitness. Warriors and athletes alike have trained daily for years in order to maximize their strength, performance, and body appearance (Kyle 17 & Sylvester 2, 3). With that in mind, there are many different types of techniques and regiments that are taught and can be learned, in order to condition the body. Such techniques can involve weight lifting, running, swimming, aerobics, and isometrics, just to name a few. Although there are many different techniques, each regiment and method of body conditioning contains various limitations, such as one building muscle mass and strength but not aiding in endurance, fat loss, or giving performance improvements. Thus, in order to gain a proper balance in body conditioning, composition, and performance, a person must train the body with a variety of methods, such as mentioned, thereby wasting time, effort, and often lacking true specificity of training.

In essence, the key is to find an exercise that can provide the best balance between muscle mass, strength, endurance, overall body composition, and performance. Is there such an exercise? Today, throughout the world, weight lifting is the most commonly used form of resistant training for developing strength, power, endurance, varying degrees of muscle mass, and developing explosive power, (performance related) etc., depending upon intensity, frequency, and duration of movement. However, there is a type of training that there has been very little, if any studies about, or is highly well known. This training is similar to isotonic, isometric, and isokinetic training in that it uses aspects of all three; it is called Dynamic Muscle

Tension.

Does training with weights make you a better athlete? That is a question athletes have long pondered. Certainly, weight training can give you added strength and power. But does that strength and power come at the expense of flexibility, speed and coordination? No matter which side you take in the weight-training debate, one point is inarguable: Strength and power are vital components of effective athletes and for overall health and performance (McGlenn 3,4). But what is the best method of improving power or strength in performance? Is it weight training, as some insist, or are there other ways to increase strength?

A famous "Charles Atlas" story might be an indication to a possible alternative and answer: "Well, sir, I was standing there in front of a lion's cage, and the old gentleman was lying down asleep, and all of a sudden he gets up and gives a stretch. Well, he stretched himself all over - you know how they do, first one leg and then another - and the muscles ran around like rabbits under a rug. I says to myself, 'Does this old gentleman have any barbells, any exercisers? No, sir. Then what's he been doing? And it came to me. I said to myself, He's been pitting one muscle against another! In less than twelve months by this method of exercising, I doubled my weight, and I became so strong that I beat up the guy who had given me the beating (Charles Atlas Notes - Web)."

The alternative to weight training that Charles Atlas discovered and that many "martial artists have trained with for centuries" (Shaolin Arts.com - Web) is "dynamic tension." Dynamic tension exercises are movements that are performed against imaginary resistance, and are integrated with controlled breathing techniques. For example, rather than hit a heavy bag with a punch or kick, or lift an external object extrinsically like a weight several times, the practitioner can intrinsically tighten his muscles, overloading them and restricting his technique as though himself, someone else, or an object was pushing or pulling against that muscle.

Although dynamic tension might appear to be a "lazy man's approach" to strength conditioning, it is quite the contrary. It would seem that these exercises might be a superior aid to muscle and skill performance development. In fact, from the researchers own experience and other peers he has worked with, “dynamic tension” exercise is much more demanding physically, than weight lifting. The main muscle parameter of weight training is predominately learning to overcome inertial change, for which there is not as much full muscular control and usage involved. However, when doing dynamic tension training, an individual is using a valid criterion-based movement to consciously train stiffness and relaxation in muscles both individually and collectively. Thus, the result would naturally be finer development and recruitment of motor responses in each muscle through exertion, thus requiring a higher demand physically in a shorter period of time.

The greatest and most talented athletes and high achievers have one simple thing in common; and that is, they have developed an extremely high level of control in mental concentration in relation to the muscular tension in their bodies. Excessive muscle tension and a loss of mental concentration will greatly interfere with an athlete’s performance (Nideffer 11).

Dynamic tension training is a possible solution in reaching a new level of physiological cohesion between the mind and body. After all, some of the greatest specimens of balanced physical performance (speed, strength, endurance, and power) have come from the martial arts. Is there a link between mental focus, physical performance, and muscular adaptation? Most would say “yes” to this question, obviously; but what exactly are the limits? The researcher proposes there are none, and that “Dynamic Tension Training” is the next evolution of superior physical, mental, and even spiritual conditioning.

Dynamic Tension Exercises:

The major advantage of dynamic tension training is that you can build strength, power, control, and endurance as you practice your athletic event, which is not usually the case in weight training. Virtually any athletic movement may be used in dynamic tension training; however, a difference from weight training for example, is that each movement is usually done at a slower rate of speed; however, different speeds can and should be used. This type of training in the researcher's opinion helps to develop a higher sensitivity and level of motor control in each muscle. Also, dynamic tension training is a form of interval training, in which different exercises are performed together and one after the other.

First, you must begin with basic techniques and progress to more advanced maneuvers as you get comfortable with the exercises. When you are practicing your event, start each dynamic tension exercise by assuming the desired stance, and then begin to make the various basic movements that your skill may require. Tighten each muscle separately and simultaneously in your hands, arms, shoulders, back, abdomen, hips, legs and feet as necessary. You can begin and end each muscle tension session at any point in the body's musculature, preferably from end to end. As you move, move slowly and deliberately in the various directions required for your particular athletic event against the self-imposed near maximal resistance. Lower-body movements tend to be more difficult than upper-body maneuvers, due to the fact you must often balance on one leg during the movements. Once you have mastered practicing single maneuvers with dynamic tension, you may begin integrating combinations of movements with each other and increasing speed of movement.

The researcher believes, that dynamic tension training can add new insight and meaning to an athlete's general understanding of tension and relaxation, in relation to movement dynamics. By controlling antagonistic muscle tension and breath, timing and coordination are not interfered with because a person's energy has been directed to the appropriate muscle groups, rather than simply increasing tension in general to the muscles (Nideffer 22). It is as much mental as it is physical. For example, an athlete can mentally assign a weight or object, and tense his muscles accordingly. Also, virtually all upper-body weightlifting exercises (curls, bench press, military press, etc.) can be simulated in mock weight training. Leg exercises such as the leg press, hamstring curls, and squats can also be performed with dynamic tension. Dynamic tension exercises should be performed in a forceful and controlled manner.

Breathing:

No discussion of dynamic tension training is complete without mentioning proper breathing techniques. Breathing is the backbone of tension training, setting the pace of the movements while adding power, control, and efficiency to them. The integration of deep respiration in dynamic tension training creates an extreme synergy between muscle performance, breath, and movement. The muscles tense as you exhale, hardening the body while increasing a movement's power potential. It is also advisable to inhale and exhale through the nose as you train, thus maintaining a natural equilibrium. Although, exhalation through the mouth is acceptable, and if possible, a person should avoid inhaling and exhaling through the mouth only; this is so the air can be fresh, clean, and with a proper temperature and moisture control.

Inhalation should occur in the relaxation stage, bathing the muscles in vitalizing oxygen as you prepare to execute a movement, and should be no more than two-thirds as long as the exhalation. Exhalation should occur as you actually perform the movement, and should last the entire duration of the maneuver. If done properly, inhalation should take a maximum of three seconds, while exhalation should last about five seconds roughly, depending upon an athlete's oxygen requirements and physical ability. This information is from the researchers own experience and is merely a starting point, which could vary depending upon a variety of personal requirements and factors.

Statement of Project:

The purpose of this study was to research whether or not Dynamic Muscle Tension Training is an effective form of developing general strength, increasing muscle girth, lowering a persons resting heart rate, and possibly contributing to fat loss; however, fat loss was not expected due to the limited exercise movements performed in the study.

Note: At a later point, the researcher will conduct further studies to compare the effects of dynamic tension training in relation to weight training, as well as studying the implications of how dynamic tension training can improve performance in athletic skill, which the researcher believes will be the true test of the benefits of dynamic tension training.

Hypothesis:

Dynamic Muscle Tension Training is a highly effective method of developing general strength, increasing muscle girth, and possibly lowing a persons resting heart rate; however, it proved not to contribute to fat loss because of the limited movements, subject variability, and anaerobic nature of the study.

<u>Delimitations</u>:

1. The test was conducted with 15 subjects, 13 were students, and 2 were professors of BYU-Hawaii.
2. There were 6 males and 9 females' that participated.
3. Ages of subjects were between 18-58.

<u>Limitations</u>:

1. Equipment failure due to faulty material or overuse – None occurred.
2. Test subjects not following test requirements – None occurred or was adjusted.
3. Test subjects absent from a scheduled testing or training dates due to various reasons – Not a factor.
4. Bio-Electric Impedance Scales have low reliability in determining body fat and lean muscle – Not used in final stats.

<u>Definition of Terms</u>:

Dynamic Tension – Specific, focused, individualized, and collective muscle tension with movement, working muscle against muscle with relaxation of the muscle at the end of the movement.

Isotonic Exercise – Exercise against resistance while the load remains constant, with the resistance varying with the angle of the joint.

Isometric Exercise – A contraction performed against a fixed or immovable resistance, where tension is developed in the muscle but there is no change in the length of the muscle or the angle of the joint.

Isokinetic Exercise – A contraction in which the muscle contracts maximally at a constant speed over a full range of the joint movement against a variable resistance.

Intrinsic – Belonging wholly within an entity as a basic and essential element, in itself, rather than by associations or consequences.

Extrinsic – Not an essential part or operating on the outside of an entity.

Skinfold Test – Method of estimating body fat by measuring subcutaneous fat with skinfold calipers.

Bio-Electric Impedance – A process by which a small electrical current is sent through the body to measure the impedance, or resistance to that current. Biological tissues (muscle, fat, bone, and connective tissue) act either as conductors of or insulators to, the current.

Surface Anthropometry – The study and technique of taking human body measurements, especially for use on a comparative or classification basis.

Body Composition – The proportion of body fat to lean body tissue.

Muscle Strength – The force produced by a muscle group.

Frequency – The number of exercise bouts.

Intensity – The level of physiological stress on the body during exercise.

Duration – The amount of time utilized for each exercise bout.

Weight Training – Physical training using weights to strengthen the muscles.

Aerobic Exercise – Continuous, rigorous exercise lasting beyond one to two minutes, utilizing oxygen relatively.

Anaerobic Exercise – All-out exercise lasting one to two minutes, performed in the absence of oxygen relatively.

Specificity – The concept that exercises are specific to the type of athletic training performed.

Overload – Forcing a muscle to contract at maximum or near maximum tension.

Interval Training – Periods of intense training interspersed with rest periods.

Warm-Up – Exercises performed immediately before physical activity to prepare the heart, lungs, and muscles to adequately meet the demands of rigorous exercise.

PNF Stretching - (Proprioceptive Neuromuscular Facilitation) is to get into a stretch, then to apply an isometric contraction for a few seconds, relaxing, and then going even deeper into that stretch.

<u>Justification</u>:

There are many types of training regiments that help to develop a persons strength, power, muscle mass, endurance, and can increase a person's athletic performance. Accept for weight training, which is still limited, there lacks an effective exercise regiment that can predominantly address all of the above physical aspects and capabilities in a short amount of time, as well as with the least amount of equipment or relative safety. A person must often use a variety of exercise methods in order to gain some semblance of balance in health or in muscular structure and performance; at the same time that person may sacrifice time, money, freedom from injury, and even performance. The study has shown that by training the upper body with dynamic tension exercises, a person can greatly enhance general body condition, increase strength, increase muscle girth, and possibly improve a persons resting heart rate, while doing so safely and healthily, compared to the more common and traditional training regiments, such as weight lifting or running.

The data obtained from this study has determined that Dynamic Tension Training can be an effective training regiment; it has also determined that it can be a more balanced alternative to conditioning the body safely, efficiently, and in a timely manner.

"Chapter II"

Procedures:

This study was conducted to determine the effectiveness of Dynamic Tension Training. Fifteen subjects followed a specified exercise training routine and completed this study. In order to facilitate completion of the study, the following methods and procedures were followed.

1. The study was conducted in a vacant BYU-Hawaii classroom and another private and ventilated locations.
2. Bench press, lat pull-down, butterfly, and biceps curl machines were required for both pre and post tests of the two comparative groups.
3. Fat measuring calipers for pre and post test skin fold analysis measurements.
4. Measuring tape for pre and post test Surface Anthropometry girth measurements.
5. Bio-Electric Impedance Analysis handheld scale for pre and post test fat measurements.
6. Stop watch for measuring heart rate before and after training & pre and post test.
7. Blood pressure cuffs and stethoscope for pre and post tests, analyzing subjects blood pressure.
8. Record keeping materials for the recording of information and results.

Participants:

1. Subjects were BYU-Hawaii students and faculty between the ages of 18 to 58.
2. The study consisted of 6 male and 9 female subjects.

Pre & Post Tests:

1. Subject's Blood Pressure was measured using standard blood pressure cuffs, a stethoscope, and recorded.
2. Subjects took their own pulse for 30 seconds; the results were calculated x2 for bpm and recorded.

3. Subjects' upper body was measured in circumference while tensing each muscle at the forearm (1" below crease), biceps (while bent squared), chest (centered "upper chest for females" & elbows raised bent & hands in front forward), and neck (base).
4. Subjects body weight, lean body mass, and fat content was measured using a handheld BioElectric Impedance Analysis machine, done twice then averaged. *Note: Subjects did not eat or drink anything for 2 hours prior to testing, accept two cups of water when needed. This was to help promote consistency in the testing.*
5. Subjects had skin fold fat measurements on the right side with relaxed muscles at the triceps (midway), biceps (midway), thigh (midway), abdominal (men, next to belly button), side waist (women, at the suprailium); this will be done twice then averaged.
6. Subjects did a 3RM on the lat pull down machine, bench press machine, butterfly machine, and biceps curl machine, done three times taking the heaviest lift with a 3-minute rest between each set. Those who lifted more than the machine weight limit in a lift used free weights for that individual lift (*only one person use free weights on 2 of the lifts*).

<u>Doing Dynamic Tension Exercises</u>:

Instructions: Subjects stood five feet apart from one another with feet comfortably shoulder width apart. Subjects did full body (every joint) joint rotations as a flexibility and warm up exercise, which included full arm and leg extension rotations and lifts, as well as focused on breathing deeply and slowly. As a training routine in Dynamic Tension, subjects performed four basic movements with both arms at the same time remembering to breath deeply and slowly. Each movement was an imitation of a weight lifting movement; they were the bench press, butterfly, overhead press, and the biceps curl.

Each one directional movement on exhalation (through the mouth or nose) at near maximal tension lasted five seconds with a three second inhalation through the nose and relaxation at the completion of one direction, then repeated going the reverse direction to the starting position. Three sets of three repetitions for each exercise was performed with a one-minute break between sets and a three-minute break between exercises.

At the end of a session, subjects performed deep breathing while doing PNF (Proprioceptive Neuromusclar Facilitation) stretching of the arm muscles. Two Latissimus dorsi-tricep stretches was performed as well as an anterior-superior deltoid, pectoralus major, and bicep stretch with a partner. Also, immediately before each full session, subjects took their own pulse for 30 seconds, multiplied x2 for per minute, and recorded by the researcher. The full program took approximately 30 minutes, once subjects were familiar with the training.

Program:

1. Pulse taken and recorded – 30 sec.
2. Warm Up / Joint Rotations & Deep Breathing – 5 min.
3. Overhead Push/Pull – 3 reps/3 sets
4. Butterfly – 3 reps/3 sets
5. Bicep Curl – 3 reps/3 sets
6. Bench Press – 3 reps/3 sets
7. Cool Down / PNF Stretching – 5 min.

Frequency:

Subjects trained 3 times per week for a duration of 5 weeks. (*Note: Six of the subjects performed the study for a duration of 10 weeks, which also included a pre, interim, and post test. However, these results were not used for this study, because of the low number of subjects.*)

Analysis of Data:

1. Test results were analyzed using the Paired Sample T-test. This test was conducted with a P-value of 0.05 for level of significance, which also determined the means, average, and standard deviations for each aspect tested.
2. Personal statements were received from some subjects in relation to their experiences, feelings, and observations during the study.

"Chapter III"

Results:

Test results are as follows:

Men's Strength T-Test

Table 1. Men's Strength Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BUTFLYM1	140.0000	6	29.49576	12.04159
	BUTFLYM2	160.0000	6	27.56810	11.25463
Pair 2	LATM1	120.8333	6	23.75219	9.69679
	LATM2	150.0000	6	24.69818	10.08299
Pair 3	BICEPCM1	76.6667	6	25.23225	10.30102
	BICEPCM2	88.3333	6	20.89657	8.53099
Pair 4	BENCHM1	200.0000	6	20.49390	8.36660
	BENCHM2	215.8333	6	14.28869	5.83333
Pair 5	TOTSTRM1	537.5000	6	89.31685	36.46345
	TOTSTRM2	614.1667	6	70.02976	28.58953

Table 1 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 2. Men's Strength Correlations

		N	Correlation	Sig.
Pair 1	BUTFLYM1 & BUTFLYM2	6	.867	.025
Pair 2	LATM1 & LATM2	6	.938	.006
Pair 3	BICEPCM1 & BICEPCM2	6	.955	.003
Pair 4	BENCHM1 & BENCHM2	6	.581	.227
Pair 5	TOTSTRM1 & TOTSTRM2	6	.908	.012

Table 2 lists correlations and significance of lifts.

Table 3. Men's Strength Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	BUTFLYM1 BUTFLYM2	-20.0000	14.83240	6.05530	-35.5656	-4.4344	-3.303	5	.021
Pair 2	LATM1 LATM2	-29.1667	8.61201	3.51584	-38.2044	-20.1289	-8.296	5	.000
Pair 3	BICEPCM1 BICEPCM2	-11.6667	8.16497	3.33333	-20.2353	-3.0981	-3.500	5	.017
Pair 4	BENCHM1 BENCHM2	-15.8333	16.85724	6.88194	-33.5239	1.8573	-2.301	5	.070
Pair 5	TOTSTRM1 TOTSTRM2	-76.6667	38.94440	15.89899	-117.5363	-35.7970	-4.822	5	.005

The Mean for Men's Strength (Table 3) demonstrates that there is an average strength increase of 76 pounds per individual for the entire group. This data suggests that there is a significant increase at the 95% confidence level for most lifts.

Women's Strength T-Test

Table 4. Women's Strength Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BUTFLYW1	61.1111	9	13.41123	4.47041
	BUTFLYW2	72.2222	9	13.71840	4.57280
Pair 2	LATW1	66.1111	9	5.46453	1.82151
	LATW2	89.4444	9	12.85604	4.28535
Pair 3	BICEPCW1	18.8889	9	8.93650	2.97883
	BICEPCW2	27.7778	9	10.03466	3.34489
Pair 4	BENCHW1	101.1111	9	17.46027	5.82009
	BENCHW2	122.2222	9	20.32718	6.77573
Pair 5	TOTSTRW1	247.2222	9	34.19714	11.39905
	TOTSTRW2	311.6667	9	43.58899	14.52966

Table 4 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 5. Women's Strength Correlations

		N	Correlation	Sig.
Pair 1	BUTFLYW1 & BUTFLYW2	9	.902	.001
Pair 2	LATW1 & LATW2	9	.455	.219
Pair 3	BICEPCW1 & BICEPCW2	9	.910	.001
Pair 4	BENCHW1 & BENCHW2	9	.573	.107
Pair 5	TOTSTRW1 & TOTSTRW2	9	.725	.027

Table 5 lists correlations and significance of lifts.

Table 6. Women's Strength Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	BUTFLYW1 BUTFLYW2	-11.1111	6.00925	2.00308	-15.7302	-6.4920	-5.547	8	.001
Pair 2	LATW1 LATW2	-23.3333	11.45644	3.81881	-32.1395	-14.5271	-6.110	8	.000
Pair 3	BICEPCW1 BICEPCW2	-8.8889	4.16667	1.38889	-12.0917	-5.6861	-6.400	8	.000
Pair 4	BENCHW1 BENCHW2	-21.1111	17.63834	5.87945	-34.6691	-7.5531	-3.591	8	.007
Pair 5	TOTSTRW1 TOTSTRW2	-64.4444	30.15009	10.05003	-87.6199	-41.2690	-6.412	8	.000

The Mean for Women's Strength (Table 6) demonstrates that there is an average strength increase of 64 pounds per individual for the entire group. This data suggests that there is a significant increase at the 95% confidence level for all lifts.

Men's Body Fat Comparisons T-Test

Table 7. Men's Fat Caliper Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	THIGHM1	16.1667	6	10.22578	4.17466
	THIGHM2	15.1667	6	6.04290	2.46700
Pair 2	WAISTM1	23.7500	6	18.07208	7.37789
	WAISTM2	24.2917	6	16.43199	6.70833
Pair 3	BICEPM1	6.2500	6	3.55668	1.45201
	BICEPM2	5.8958	6	2.88034	1.17589
Pair 4	TRICEPM1	10.2917	6	4.56184	1.86236
	TRICEPM2	11.7292	6	6.20152	2.53176
Pair 5	TOTFATM1	56.4583	6	35.44271	14.46942
	TOTFATM2	57.0833	6	30.95841	12.63872

Table 7 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 8. Men's Body Fat Correlations

		N	Correlation	Sig.
Pair 1	THIGHM1 & THIGHM2	6	.973	.001
Pair 2	WAISTM1 & WAISTM2	6	.969	.001
Pair 3	BICEPM1 & BICEPM2	6	.975	.001
Pair 4	TRICEPM1 & TRICEPM2	6	.914	.011
Pair 5	TOTFATM1 & TOTFATM2	6	.978	.001

Table 8 lists correlations and significance of lifts.

Table 9. Men's Body Fat Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	THIGHM1 THIGHM2	1.0000	4.56070	1.86190	-3.7862	5.7862	.537	5	.614
Pair 2	WAISTM1 WAISTM2	-.5417	4.58371	1.87129	-5.3520	4.2686	-.289	5	.784
Pair 3	BICEPM1 BICEPM2	.3542	.98557	.40236	-.6801	1.3885	.880	5	.419
Pair 4	TRICEPM1 TRICEPM2	-1.4375	2.74858	1.12210	-4.3220	1.4470	-1.281	5	.256
Pair 5	TOTFATM1 TOTFATM2	-.6250	8.26967	3.37608	-9.3035	8.0535	-.185	5	.860

The Mean for Men's Body Fat Comparisons (Table 9) demonstrates that there is an average fat increase of .6 mm per individual for the entire group. This data suggests that there is a small increase of fat at the 95% confidence level for most individuals. However, since the exercise program was limited and most subjects gained weight during the study, the data cannot conclude the benefits in relation to fat-loss.

Women's Body Fat Comparisons T-Test

Table 10. Women's Fat Caliper Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	THIGHW1	25.6944	9	9.91824	3.30608
	THIGHW2	27.1667	9	10.94303	3.64768
Pair 2	WAISTW1	22.1111	9	7.54063	2.51354
	WAISTW2	21.5278	9	7.95367	2.65122
Pair 3	BICEPW1	11.6111	9	7.48552	2.49517
	BICEPW2	11.1806	9	6.64182	2.21394
Pair 4	TRICEPW1	19.5139	9	7.85574	2.61858
	TRICEPW2	20.4722	9	8.71797	2.90599
Pair 5	TOTFATW1	78.9306	9	30.30400	10.10133
	TOTFATW2	80.3472	9	31.89238	10.63079

Table 7 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 11. Women's Body Fat Correlations

		N	Correlation	Sig.
Pair 1	THIGHW1 & THIGHW2	9	.901	.001
Pair 2	WAISTW1 & WAISTW2	9	.938	.000
Pair 3	BICEPW1 & BICEPW2	9	.986	.000
Pair 4	TRICEPW1 & TRICEPW2	9	.852	.004
Pair 5	TOTFATW1 & TOTFATW2	9	.940	.000

Table 11 lists correlations and significance of lifts.

Table 12. Women's Body Fat Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval	of the Difference	t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	THIGHW1 THIGHW2	-1.4722	4.75730	1.58577	-5.1290	2.1846	-.928	8	.380
Pair 2	WAISTW1 WAISTW2	.5833	2.75355	.91785	-1.5332	2.6999	.636	8	.543
Pair 3	BICEPW1 BICEPW2	.4306	1.45923	.48641	-.6911	1.5522	.885	8	.402
Pair 4	TRICEPW1 TRICEPW2	-.9583	4.58556	1.52852	-4.4831	2.5664	-.627	8	.548
Pair 5	TOTFATW1 TOTFATW2	-1.4167	10.90531	3.63510	-9.7992	6.9659	-.390	8	.707

The Mean for Women's Body Fat Comparisons (Table 12) demonstrates that there is an average fat increase of 1.4 mm per individual for the entire group. This data suggests that there is a large increase of fat at the 95% confidence level for most individuals. However, since the exercise program was limited and most subjects gained weight during the study, the data cannot conclude the benefits in relation to fat-loss.

Men's Girth Measurements T-Test

Table 13. Men's Girth Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	UPGM1	13.6458	6	1.34494	.54907
	UPGM2	13.9167	6	1.31022	.53489
Pair 2	LOWGM1	11.5833	6	.97361	.39747
	LOWGM2	11.7083	6	.86120	.35158
Pair 3	CHESTGM1	39.8333	6	2.23979	.91439
	CHESTGM2	40.6458	6	3.11590	1.27206
Pair 4	WAISTGM1	36.7708	6	6.31388	2.57763
	WAISTGM2	36.0625	6	4.66687	1.90524
Pair 5	NECKGM1	15.9792	6	1.00130	.40878
	NECKGM2	16.1875	6	1.00234	.40920
Pair 6	TOTGM1	117.8125	6	10.73043	4.38068
	TOTGM2	118.5208	6	10.46405	4.27193

Table 13 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 14. Men's Girth Correlations

		N	Correlation	Sig.
Pair 1	UPGM1 & UPGM2	6	.927	.008
Pair 2	LOWGM1 & LOWGM2	6	.974	.001
Pair 3	CHESTGM1 & CHESTGM2	6	.859	.029
Pair 4	WAISTGM1 & WAISTGM2	6	.991	.000
Pair 5	NECKGM1 & NECKGM2	6	.796	.058
Pair 6	TOTGM1 & TOTGM2	6	.977	.001

Table 14 lists correlations and significance of lifts.

Table 15. Men's Girth Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	UPGM1 UPGM2	-.2708	.50878	.20771	-.8048	.2631	-1.304	5	.249
Pair 2	LOWGM1 LOWGM2	-.1250	.23717	.09682	-.3739	.1239	-1.291	5	.253
Pair 3	CHESTGM1 CHESTGM2	-.8125	1.65596	.67604	-2.5503	.9253	-1.202	5	.283
Pair 4	WAISTGM1 WAISTGM2	.7083	1.80220	.73574	-1.1830	2.5996	.963	5	.380
Pair 5	NECKGM1 NECKGM2	-.2083	.64064	.26154	-.8806	.4640	-.797	5	.462
Pair 6	TOTGM1 TOTGM2	-.7083	2.28263	.93188	-3.1038	1.6871	-.760	5	.481

The Mean for Men's Girth Measurements (Table 15) demonstrates that there is only a .7-inch girth increase per individual for the entire group. This data suggests that there is not a significant increase at the 95% confidence level for all lifts.

Women's Girth Measurements T-Test

Table 16. Women's Girth Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	UPGW1	12.1944	9	1.72992	.57664
	UPGW2	12.6389	9	1.65530	.55177
Pair 2	LOWGW1	9.9861	9	.88707	.29569
	LOWGW2	10.1944	9	.84111	.28037
Pair 3	CHESTGW1	36.7917	9	5.62500	1.87500
	CHESTGW2	38.5000	9	2.87432	.95811
Pair 4	WAISTGW1	34.0694	9	4.44590	1.48197
	WAISTGW2	34.5417	9	3.95285	1.31762
Pair 5	NECKGW1	13.6811	9	.67804	.22601
	NECKGW2	13.9028	9	.84034	.28011
Pair 6	TOTGW1	106.7228	9	12.23927	4.07976
	TOTGW2	109.7778	9	9.52008	3.17336

Table 16 lists individual pre and post test means, standard deviations, and standard error means for each lift.

Table 17. Women's Girth Correlations

		N	Correlation	Sig.
Pair 1	UPGW1 & UPGW2	9	.950	.000
Pair 2	LOWGW1 & LOWGW2	9	.962	.000
Pair 3	CHESTGW1 & CHESTGW2	9	.895	.001
Pair 4	WAISTGW1 & WAISTGW2	9	.957	.000
Pair 5	NECKGW1 & NECKGW2	9	.805	.009
Pair 6	TOTGW1 & TOTGW2	9	.957	.000

Table 17 lists correlations and significance of lifts.

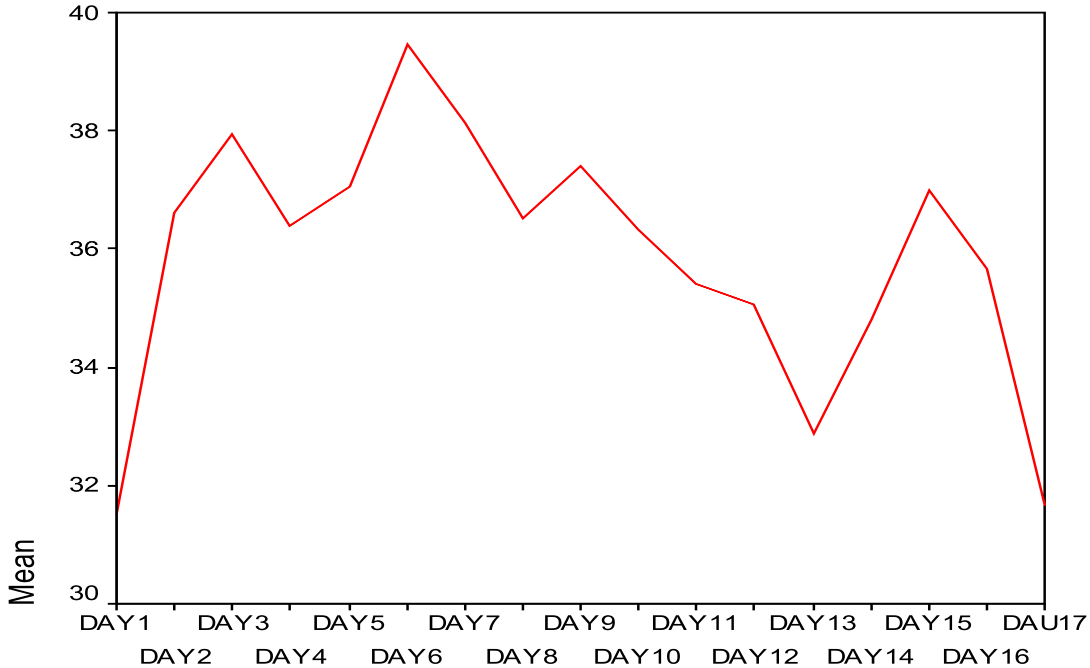
Table 18. Women's Girth Tests Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval	of the Difference	t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	UPGW1 UPGW2	-.4444	.53805	.17935	-.8580	-.0309	-2.478	8	.038
Pair 2	LOWGW1 LOWGW2	-.2083	.24206	.08069	-.3944	-.0223	-2.582	8	.033
Pair 3	CHESTGW1 CHESTGW2	-1.7083	3.31132	1.10377	-4.2536	.8370	-1.548	8	.160
Pair 4	WAISTGW1 WAISTGW2	-.4722	1.32550	.44183	-1.4911	.5466	-1.069	8	.316
Pair 5	NECKGW1 NECKGW2	-.2217	.49894	.16631	-.6052	.1619	-1.333	8	.219
Pair 6	TOTGW1 TOTGW2	-3.0550	4.18489	1.39496	-6.2718	.1618	-2.190	8	.060

The Mean for Women's Girth Measurements (Table 18) demonstrates that there is a 3-inch girth increase per individual for the entire group. This data suggests that there is a significant increase at the 95% confidence level for all lifts.

Average Pulse Rates (# halved) for All Subjects - Duration of Study

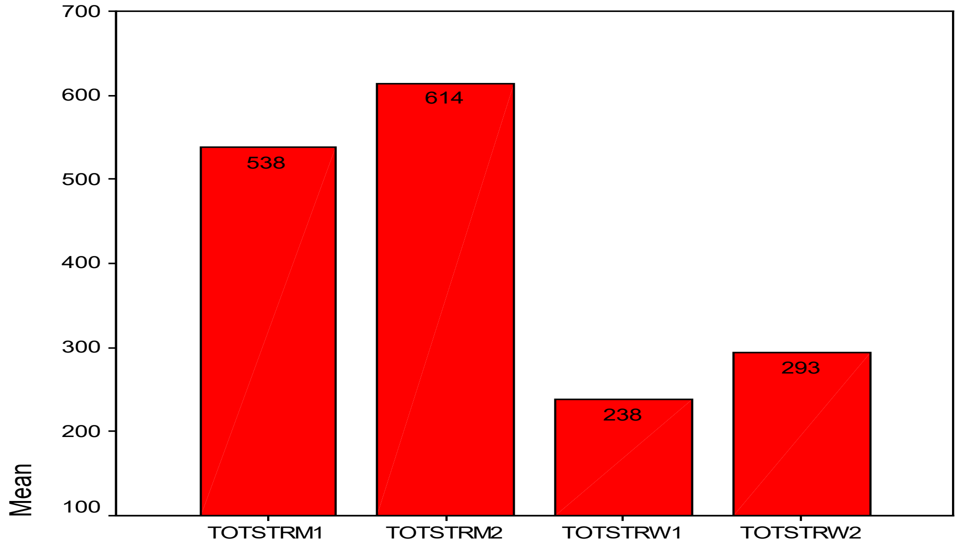
Graph 1.



Graph 1 points out that there is possibly a decrease in the average resting pulse rate for all individuals during the second half of the study. However, this is not conclusive with the data and the time involved in the study.

Average Strength Gains - Men & Women

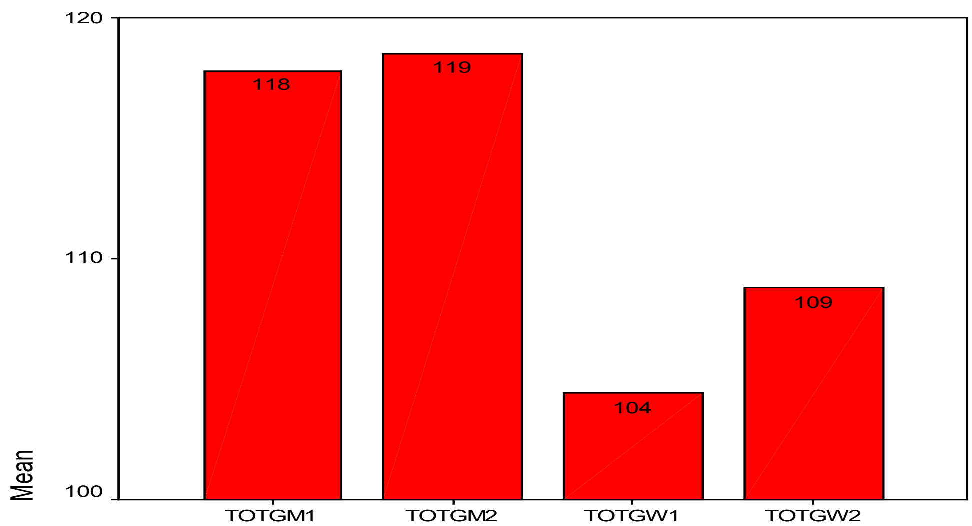
Graph 2.



Graph 2 indicates the average individual pre and post results of pounds lifted for all tested lifts combined. Men had an average increase of 76 pounds for the 5-week period of the study, and women had an average increase of 55 pounds during the study.

Average Girth Increases - Men & Women

Graph 3.



Graph 3 indicates the average individual pre and post test results for all girth measurements. Men increased an average of 1 inch during the 5-week period of the study, and women increased an average of 5 inch's during the study.

<u>Analysis of Data</u>:

The results received from this study were based upon the scores from several Paired Sample T-Tests having a .05 level of significance or greater. The means, standard deviations, and standard error deviations were determined for each test variable, as well as for each grouping.

The Strength T-scores for both men and women were *all within* the range of the .05 level of significance. This *supports* the hypothesis that dynamic tension training can increase general strength of both men and women.

The Fat Measurements T-scores for both men and women were *not within* the range of the .05 level of significance. This *does support* the hypothesis that the dynamic tension training used for this study would probably not decrease fat content in men and women.

The Girth T-scores for both men and women were *not all within* the range of the .05 level of significance. However, *there were increases in girth size* for all individuals, so the results may still support the hypothesis that dynamic tension training can increase muscle girth; although, the increases were negligible at the .05 level.

As a result of these statistics, it can be determined that there were significant changes at the .05 level in most aspects as expected. See also Appendix for additional stats.

<u>Conclusion</u>:

The researcher concludes that as far as the study shows, Dynamic Muscle Tension Training can be an effective method of developing general strength, increasing muscle girth, and possibly lower a persons resting heart rate. However, it proved not to contribute to fat loss.

Recommendations:

As a result of this study, the researcher recommends the following:

1. Controlling activities engaged in, and eating habits of all subjects.
2. A more controlled approach for selecting types of subjects, i.e.: body types, exercise activity levels, gender, etc.
3. Researching the effects compared to a control group.
4. Researching the effects in relation to weight lifters.
5. Researching the effects of using free weights compared to machines for the possible differences between pre and post testing, also against a control group.
6. Researching a full body approach to doing Dynamic Tension Training, for specificity in results and the benefits thereof.
7. Having more subjects to get more accurate results.
8. Having incentives to complete the study. The study was actually 10 weeks; however, only 6 subjects completed the 10-week period, so only the first five weeks with 15 subjects was used for the stats. There were however, good results from the group that did the 10 weeks.

Works Cited

Kyle, Donald G. and Gary D. Stark. Essays on Sport History & Sport Mythology. Arlington, TX.: Texas A&M, 1990.

Silvester, L. Jay. Weight Training for Strength and Fitness. Boston, MA.: Jones & Bartlett, 1992.

McGlynn, George. Dynamics of Fitness. Dubugue, Iowa: Wm. C. Brown, 1987.

Charles Atlas Notes. The Discovery of Dynamic Tension. Referenced: 5 March 2000 {http://www.fortress.am/users/mas/Atlas/lion.html}.

Shaolin Arts.com. Shaolin History. Referenced: 23 Feb. 2000 {http://www.shaolinarts.com/pages/history.html}.

Nideffer, Robert M. Athletes Guide to Mental Training. Champaign, Ill.: Human Kinetics, 1985.

“Senior Project Summary and Professional Self-Evaluation”

A.

I was highly motivated and exited to have been able to develop and implement this project. It gave me an opportunity to prove the validity of one of the relatively unknown training methods that are a part of a full bodied, balanced, efficient, and holistic program that I have developed and will soon publish. It was an excellent opportunity for me to refine and develop my program in a more scholarly fashion. I have learned a great deal, though it was a lot of work. I also learned that no matter how perfect a program is or how much you get peoples interest, it is very difficult to keep people self-motivated and that they have their own choices and interests. I began the study with 27 subjects and then ended up with 15 halfway and then 6 at the end.

Being a completely new experience for everyone, it was a challenge to get them to understand the workings of the exercise and to make it their own. I had to do a lot of explaining and demonstration constantly throughout the study, especially reminding them how to do things. However, most subjects picked up the techniques and became proficient at them. I also noticed that depending on the amount of effort and intensity I observed with each individual, it was specifically correlated to how much they progressed in strength development.

B.

1. I would have to say that my greatest assets or strengths would have to be my ability to be highly positive and good-natured. I also work very hard to do things the very best that they can be done. Some might call me a perfectionist.
2. My greatest weakness could perceivably be my limited amount of on the job experience in P.E. or I.S. However, I do have the necessary knowledge as well as having the experience in other areas that can demonstrate my leadership ability’s.

C.

Within five years from now, I see myself working in the Web Design field as well as being a substitute teacher, volunteer coach and Martial Arts instructor. I also see myself getting a Master's Degree in Education with a Physical Education Emphasis at UNLV.

Ten years from now I plan on being a secondary school teacher in Physical Education and Computers, a Coach, and possibly even a Music teacher.

D.

Because I know the system all to well, the recommendations that I give will more than likely be glanced over and not given much consideration. This is simply due to the fact that the changes I recommend will predominately incorporate changing the entire school structure, and not simply the EXS department. Things have stayed the same for basically the last 100 years, so I don't expect much.

1. I highly suggest that the EXS department and the school shift it's focus from trying to make perfect programs, to trying to make perfect students. Instead of trying to force students to adapt to the programs, the programs should be adapted to the students, so that the most amount of learning can take place, instead of just busy work. The old system of simply shoving as much info into people as possible is just not good for society. It creates fat, tired, out of shape, and depressed people, at least for many of the ones that are able to "survive". It is the same philosophy of making a standard for the few that can do something successfully and then saying too bad to the rest that can't handle it as well. The new paradigm should focus on developing in each student, lifelong, balanced, and constructive life skills, not simply absorbing tones of useless facts. The paradigm should be placed on individual needs not program or institutional needs. i.e.: Forcing someone to learn thousands of crevices, bumps,

grooves, origins and insertion points, when they have absolutely no use for knowing anatomy in that kind of detail; "especially", when that time can be spent in learning other things that are highly important for the person to know and succeed in the job force (real world).

2. In relation to the first suggestion, counselors should be available to actually plan and evaluate each student's needs and goals, and then a program can be developed specifically for that student's needs and abilities. Also, the counselors can work with students personally to cooperatively assist through the student's college career. The counselors now are busy and do little more than add and drop classes and the faculty advisors don't really try to work with students personally. Everyone is simply involved in busy work, so real help, assistance and changes to the system don't occur.

In Conclusion, a lot of this might not be too specific; however, I am simply trying to show that we need to care a little more about each other personally and individually. Everyone should have the opportunity to have truly loved his or her college career. However, the opposite is true. Nearly everyone is relieved and thankful that it's over, and it shouldn't be that way. That simply indicates that the undergraduate and other educational systems are not doing their job in the best manner it could be done. After all, doesn't our best learning occur when we enjoy it?

Tell me, **I Forget**. *Show me*, **I Remember**.

Teach me, **I Learn**. ***"Involve Me"***, and **I BECOME!!!**

Appendix

- Raw Data Sheets-

A – **Weekly Attendance & Pulse Stats**

B – **Demographics, Fat & Girth Measurements**

C – **Men Strength Stats**

D – **Women Strength Stats**

E – **Selected Strength Totals / Pre & Post Tests**