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ORIGINAL

GENDER DIFFERENCES IN RESPONSE TO STRENGTH TRAINING: HORMONAL AND NEUROMUSCULAR INSIGHTS

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ABSTRACT

The variation in strength may have been caused by qualitative differences in the muscle tissue, such as a higher concentration of glycolytic enzymes and a more significant proportion of fast-type muscle fibres, even though the number of muscle fibres did not change statistically significantly between the genders studied. It is well known that men possess a larger muscular mass than women, which is packed with fast-type fibres, and a higher capacity for glycolysis. The study ascertains how gender differs in the hormonal and neuromuscular responses to strength training. Based on research, primary data analysis is used to gather data using SPSS software, which is then used to provide findings for the ANOVA test, correlation, and paired sample test between the data. The gender difference in power may be influenced by aspects related to anthropometry, task-specificity, and the anatomical characteristics of muscles. More recent studies, however, have shown that the muscle mass in the lower limbs of both men and women was normalised to provide similar amounts of power. Numerous neuromuscular parameters, such as muscle morphological traits including thickness, fascicle length, and pennation angle, affect maximal strength and power. Recent studies have revealed tenuous relationships between the vastus lateralis muscle architecture in resistance-trained people and the maximal isometric force applied at the mid-shin pull. Furthermore, a strong relationship was found between the vastus intermedius muscle's architecture and the late phase of the force generation rate during isometric leg extension. Further investigation showed shown a high correlation between peak power and the duration required to attain peak power in the Wingate test, as well as the architecture of the vastus lateralis muscle. Overall, the findings indicated a clear connection between gender variations and hormonal and neuromuscular insights.

KEYWORDS: Gender Differences (GD), Response (RR), Strength Training (ST), Hormonal (HH), Neuromuscular Insight (NI)

1. INTRODUCTION

A variety of training programs provided to athletes to enhance their performance and endurance. Strength training is also an important training aimed at developing strength, endurance, and fast recovery in athletes. As we know, females are lagging in no field of life, including the field of sports. So these strength trainings are also provided to female athletes. However, the response to this strength training is different in both genders. In this overview, we will discuss the important gender differences in response to strength training related to hormonal and neuromuscular insights(Pritzlaff-Roy et al., 2002). As we know, there are some quite physiological differences in males and females, so they should be provided with strength training according to it. Some important features in the human body are related to the strength and power of the body. One of these factors is the secretion of a hormone called testosterone. Although this hormone is considered a male hormone, it is produced in both males and females(Hunter, 2016). The amount of testosterone is high in males, so there is more strength and power in males than in females. It is because testosterone is involved in muscle growth to some extent, so when there is more secretion of testosterone, there is more power and strength in the body of a male. Although this hormone is produced in females also, it does not cause the same strength and power in females (Ribeiro Junior et al., 2023). The other important factor related to strength and power in the body is the production of estrogen. Estrogen is considered the most important female hormone, involved in the development of muscle fibers and distribution in the body. When there is more estrogen production in the female body, this aspect will help to develop muscle fibres in a better way, thus reducing the aspect of strength and power in the female(Conkright et al., 2021). We can say that testosterone is responsible for male strength, and estrogen is responsible for the strength and power of females. The other important hormone related to the strength and power of the body is the growth hormone. The pituitary gland mainly produces this hormone and has a major impact on the normal growth and development of the body. This hormone is produced throughout the life of a human being, but its quantity and pattern change according to age and other factors(Kraemer et al., 1999). Recent medical studies have proved that there is more growth hormone production in males than in the females, so this increased production of growth hormone in male's results in a stalwart appearance of the male body. Cortisol is also an important hormone that is considered to have a relation with the strength and power of the body. The body produces this hormone in different patterns according to need and factors that have caused the secretion of this hormone. For example, this hormone is secreted in response to emergency conditions but is also released when there is stress from exercise in the human body(Tarnopolsky, 1998). This aspect means that when there is more training

and exercise for both genders, it may increase the production of cortisol in the blood, and this increased level will help in better muscle growth and development. Some neuromuscular differences are also present in both genders which affect the body's response to strength training. The first major difference is related to muscle fibre type in both genders. These muscle fibre types are responsible for quick responses to neurons in the body. Recent medical studies have shown fast muscle twitch fibres in males but slow muscle twitch fibres in females. The other important neuromuscular difference between males and females is the aspect of muscle size and muscle strength. It is common observation that there is a larger muscle size in males than in females(Ansdell et al., 2020). The other observation is that male muscles have more strength and power than female muscles in response to strength training. The other aspect of neuromuscular differences between genders is related to fatigue-resistant muscles. It is pertinent to mention here that strength training may cause severe fatigue in the body of athletes, and such muscle fatigue may take different amounts of time to recover depending on the ability of the body. Beingan fatigue can resistance explained by lactate thresh the ld., which explains the limit to which muscle not get fatigued. Recent studies have proved that women have a better lactate threshold than males. This means there is more fatigue resistance in the female body compared to the male body(Fragala et al., 2011). Different outcomes have been seen as a result of strength training in both males and females. It has been observed that male athletes may show aspects of hypotrophy as compared to females. This means that there is more muscle strength and power gain in males than in females. The other outcome of strength training is related to the aspect of power output as a result of strength training. Recent medical studies have shown that there is more power output in males than in females due to strength training in both genders. The other aspect that is very important for muscle strength and power is the endurance level of both genders. Recent outcomes of strength training have proved that women may show better endurance levels than men (Ivey et al., 2000). This is because there is a better lactate threshold level in females than males. All of these aspects suggest that strength training must be provided by keeping gender in consideration(Hunter, 2014). There should be more focus on the core stability of females in strength training and more attention on the endurance level of males in strength training. This study is also helpful in that it can assist us in providing better strength training depending upon the needs of the body according to the gender of the athlete(Landen et al., 2023).

1.1 Research objective

The main objective of this research is to understand the response of both genders to strength training related to hormonal and neuromuscular insights. This study effectively explained various gender-based differences and suggested different ways to provide strength training to both genders.

2. Literature Review

The study examining workout embryology regularly incorporates just guys or doesn't think about coitus contrasts. Despite the fact that there's as yet an undercount of women members in practice investigation, current examinations have recognized coitus contrasts in Physiologic & atomic reactions to practice preparing (Landen et al., 2023). Scholars feature the impact of endogenic & exogenic sexual prophylactics on Physiological reactions to practice in ladies. Coition is part of numerous interceding effects upon results of activity, & along with cautious trial plans, anatomists may propel the aggregate comprehension of variety in embryology & upgrade results toward the two genders (Ansdell et al., 2020). This audit features the distinctions in dissection & embryology among guys & ladies that are essential definitives of the coition distinctions in sport execution & light of activity preparation, & the job of coition prednisone prophylactics (especially androgens & oestradiol). Researchers also distinguish verifiable & non-physiologic elements that impact the coition distinctions in execution. Ultimately, scholars distinguish holes in the information on coition contrasts in sports execution & the fundamental components, giving significant chances to elevated-affect reviews(Hunter et al., 2023). Studies intended to examine the speculation that there should be no coition-explicit myoneural reactions, yet endocrinal beckoning must to be discriminatively influenced when presented to reenacted armed forces functional pressure. Connections between execution & state of mind/hormone wilting feature the capacity for person-account estimates & biological indicators to act as signs of execution alteration(Conkright et al., 2021). Studies research the exchange among corpse constitution, dietetic examples, & actual work beyond sexes, centring on sexes' explicit contrasts in nourishment inclinations & devouring ways of behaving. The outcomes recommend that corpse constitution fundamentally influences wellbeing-associated ways of behaving, requiring fitted mediations to handle these distinctions & advance better ways of life(Lombardo et al., 2024). This study summarises the ongoing information on coition contrasts in engine squad conduct & prospective elements that might add to such distinctions. Scholars demonstrate critical below-portrayal of woman members in engine squad research & a predetermined several surveys researching coition contrasts in engine squad conduct. Researchers presume that there's a necessity to assemble greater information in ladies & explore coition contrasts in engine squad conduct(Lulic-Kuryllo & Inglis, 2022). The study shows contrasts in woman & macho chassis, embryology, & skeletal brawn toward the degree that practice reactions might separate in light of these variables. Enhancing preparing diets for women in view of the period might assist with diminishing wound ratios & metabolism weight related to methods customarily planned & used by guys(O'Bryan et al., 2022). This survey gives a realistic outline of vital Physiologic & dietary contemplations toward the dynamic woman. Woman endocrinal degrees, like estradiol & progestin, vary all through the mensurative

sequence & lifespan, demanding greater consideration toward viable wholesome contemplations. Coition-explicit wholesome suggestions & rules toward the dynamic woman & woman competitor came to be missing in dating & permit additional thought(Wohlgemuth et al., 2021). This analysis aimed to feature recognized coition-associated contrasts in brawn digestion & probable advantages of obstruction preparing toward old sufferers. A thorough comprehension of the difficulties & counteraction estimates introduced hither might permit practitioners to all the more probable assist their sufferers, particularly more established woman sufferers, &, at last, ease the weight put on their general public by their quickly maturing populace(Cheng et al., 2022). Researchers reveal that sexuality is significant in deciding digestion, the two in ordinary matters & in matters impacted by misfunction connected with adiponectin impedance. Concentrating on these connections might give knowledge toward in what way endocrinal alterations over various vitality phases, like pubescence, maternity, & the climacteric, influence adiponectin impedance & diabetic danger. Finally, a survey of the connection between adiponectin impedance & sexuality medication uncovers the perplexing exchange among science, endocrine, sexuality personality, & cultural variables(Ciarambino et al., 2023). Studies suggest that reflection of these investigations as an advancement account proposes that the area of employed workout, nourishment & digestion is advancing gradually to progress comprehensive coition-founded study. To provide additional information on sexuality & coition-explicit contrasts in employed workout & sustenance, creators are urged to recognize properly whether the example is comprehensive of people or men & ladies(Devries & Jakobi, 2021). Studies aim to centre around the examinations involving comparable force preparing & trial estimations in macho & woman sprinters, demonstrating that the two genders further develop pedalling execution & in this manner, may include weighty force preparing toward their ordinary preparation to develop execution further. Upgrades in the capacity to create elevated strength yield for a brief timeframe & aerobic capacities following force preparation also appear to be comparative among men & ladies' sprinters(Vikmoen & Rønnestad, 2021). The study sums up the accessible proof near the automatous job of steroids, estriols & progestins in women with emaciated brawn. An examination of the writing demonstrates that coition androgens assume significant parts in the guideline of women emaciated brawn multitude & capability(Alexander et al., 2022). The objective of this research was to assess the proof for coition-explicit corporeal, Physiologic, & psychotic-mental reactions to genuine, & reenacted army functional pressure. Although, designated practice preparing projects might be fitting to balance the actual exhibition hole among genders & streamline execution preceding inescapable downfalls brought about by extraordinary army activities(Conkright et al., 2022). Scholars suggest that to reveal insight into the unmistakable job of natural variables in the other detached aggregates; studies sum up in this survey the coition associated contrasts & their particular

organic jobs arising out of the ongoing writing in the two procured & innate muscular dystrophy(Vinciguerra et al., 2023). This research aims to investigate coition-founded contrasts in strength underlayer usage over temperate-power oxygen consuming activity; to distinguish the supporting up-and-comer Physiologic components. Postmodern examinations affirmed that macho show more prominent dependence on starches, whilst ladies depend more on phospholipids to support temperate elevated-impact work. Competitors did not affirm the last option discovery, a clever part of the current review(Cano et al., 2022). This research aims to investigate sexuality discrepancies in corpse fulfilment discernment, stressing the impact of wholesome propensities, assessment-related appraisals, degrees of actual work, & wellbeing-associated measurements. Studies feature the multifaceted interaction of societal, racial, & individual variables moulding sexuality's explicit view of corpse fulfilment & their resulting influence on well-being & way of life decisions(Jimenez-Morcillo & Clemente-Suárez, 2023). Scholars exhibit intrinsic novel, coition-subordinate contrasts in brawn transliteration reactions to aerophilic, obstruction, & joined practice preparing in youthful & more established accomplices. The endocrinal alterations along the epoch probably make sense of old enough to associate distinction articulation of records. The outcomes of this study feature the capability of planning workout schemes customized explicitly to people & have suggestions for individuals who alter their sexuality by adjusting their endocrine contour(Pataky et al., 2023). This study investigates the discoveries of surveys assessing the impacts of period work in Eumenorrheic ladies & the utilization of endocrinal contraceptives (vocal prophylactics & endocrinal intravaginal gadgets) on digestion, strong power, & recuperation in dynamic ladies. This research also inspects recuperation estimates (utilizing biological indicators, bloodline lactating, & bloodline stream) that don't account for apparent or predictable impacts of the effect of the monthly series or endocrinal contraceptive employed on recuperation(Cabre et al., 2024). Studies expected to distinguish coition contrasts inside modifications in the antitoxin cistrome corresponding to alterations in corpse structure, actual execution, & coursing pointers of hormone & metabolism state over a Seventeen-Day army preparation workout. The information also recommends that within supported armed forces preparation, ladies especially activate adipose tissue reserves contrasted & with males, which might be advantageous toward alleviating damage of muscle density & diminishing corpse force(Beckner et al., 2023). Studies aim to investigate the coition distinctions in execution & discerned exhaustion over opposition preparing endorsed utilizing customary & autoregulatory repose-reallocation preparing accesses. The autoregulatory repose-reallocation preparing address brought about diminished speed misfortune, top power weakness, & rating of exhaustion contrasted & customary in the two genders. However, male themes showed greater articulated intense inside meeting advantages from the autoregulatory repose-reallocation preparing techniques(Iacono et al., 2024). Studies featured an

ideal impact of stoutness on the focal instruments (for example., optional actuation) answerable toward pressure creation inside the down appendage brawns. However, stoutness associated with focal transformation was seen in young ladies toward the plantar flexor's brawns. In this way, the overabundance of weight upheld via the brawns engaged with load-carrying might be an ongoing preparation upgrade liable for such transformations in large youths yet generally in young ladies(Garcia-Vicencio et al., 2023). The discoveries of this study explain the mind-boggling exchange of organic, social, & sexuality-founded components in moulding dietetic inclinations & devouring ways of behaving. Specifically, studies review uncovers that sexuality elements altogether impact nourishment decisions & dietary patterns: ladies will more often than not pick better food varieties & consume customary dinners, whilst males demonstrate inclinations toward explicit preferences & feast associated ways of behaving(Feraco et al., 2024). The goal of this audit was to recognize & underscore the associations among such communications, sexuality-associated danger elements toward anterior Knee pain, & the prospective components that make sense of their relationship along different danger elements, meaning to support the production of exact anticipation & therapy draw near. Coition endocrine can as well assume a part in the danger of anterior Knee pain, with estradiol possibly impacting tendinous laxness, expanding instep area stacking & influencing contractile organ management of the below limits & androgen emphatically influencing brawn multitude & energy(Bartsch et al., 2024). This research not only features the familiar coition contrasts among people but also reveals insight into the other corporeal & Physiological reactions of every coition to armed forces preparation. This study also shows that competently checking the requests & execution results over initiating preparation is fundamental toward deciding a person's wellness capacities also laying out the viability of a preparation scheme(McFadden et al., 2024).

Table 1: Result of Model Summary

MODEL SUMMARY				
MODEL	**R**	**R SQUARE**	**ADJUSTED R SQUARE**	**STD. ERROR OF THE ESTIMATE**
1	.458[a]	.210	.141	.53253
a. Predictors: (Constant), Gender Differences, Strength Training, Response, Hormonal				

The above result in the Table 1 demonstrates that the model summary is related to the regression model. The result describes R values, R square values, and the adjusted R square, and it also explains the standard error of the estimated values. The R rate is 0.458, which shows that 45% of the model fit for analysis, and the adjusted R square value is 14%, respectively. The standard error of the estimated value of model 1 is 53%, respectively, presenting positive rates between them.

2.1 Stretching training and warm-up

The NCSA recommends that weight trainers warm up before beginning a session. This is how they always do things. Stretches for flexibility and joint mobility, static and dynamic stretching, "passive warm up" methods like using heat pads or a hot shower, and cardiovascular exercises like light stationary biking (also called a "pulse raiser") are some examples of workout-specific warm-ups. The goal of warming up is to decrease the chance of injury and increase workout efficiency. There is insufficient data to determine if warming up before strength exercise lowers the chance of injury. There was no published research as of 2015 that addressed the benefits of warming up to avoid upper body injuries. Some programs have been developed to dramatically minimise injuries to the lower limbs in sports and military training, but no comprehensive program has been built, and it's not obvious if warm-ups created for these domains would transfer over to strength training. Because static stretching has an analgesic effect and damages cells, it can increase the risk of harm. It is now evident how warming up before an exercise affects its efficacy. An exercise rehearsal is very helpful for 1RM testing. Exercise rehearsal is no better than no warm-up when it comes to fatigue or total repetitions for submaximal strength training activities like arm curls, squats, and bench presses (3 sets of 80% of 1RM until failure). Stronger and more intense warm-ups (above 20% of maximum effort) improve performance during upper-body training. The blood has begun to flow to the muscles, so when the lifter is fully warmed up, they will have more strength and endurance. Pulse raisers and submaximal training have no connection to 1RM. Static stretching is often not a good idea right before strength training since it results in a loss of strength. Resistance training is an active kind of flexibility training that improves range of motion in a manner similar to that of static stretching exercises. Static stretching does not reduce muscle soreness in healthy individuals, either before or after exercise.

Table 2: Result of Coefficients

COEFFICIENTS						
MODEL		**UNSTANDARDIZED COEFFICIENTS**		**STANDARDIZED COEFFICIENTS**	**T**	**SIG.**
		B	Std. Error	Beta		
1	(Constant)	.248	.405		.612	.544
	Response	.011	.134	.011	.079	.937
	Strength Training	.308	.152	.288	2.024	.049
	Hormonal	.595	.239	.592	2.488	.017
	Gender Differences	-.150	.253	-.141	-.591	.557
a. Dependent Variable: Neuromuscular Insights						

The above result in the Table 2 show that the coefficient analysis

incorporated the results of the linear regression analysis, showing that the unstandardized coefficient values contained the beta value and the standard error values. The outcome also provides information on each independent variable's significant value and t statistic rates. The mediator factors result reveals a positive 7% correlation and a strong 54% correlation with neuromuscular insights. Another variable that had results was strength training, with beta values of 30% and 28%, a t statistic value of 2.024, and a significant value of 0.049. It demonstrates a 4% significant favourable relationship between neuromuscular insights and strength training. There is a direct and substantial correlation between them, with a significant rate of 17% for the hormonal factor representative. The gender gap demonstrates the unfavorable but nonetheless considerable relationship that exists between them (55%). Weight training, like most forms of exercise, tends to deepen the breathing pattern. This aids in supplying more oxygen, as needed. Breathing in tiny breaths and holding them is one way to manage your breathing when lifting weights. This has the advantage of preventing hypoxia, dizziness, and elevated blood pressure. Breathing in during the eccentric period of lowering the weight and out during the concentric phase of lifting it is the standard protocol for this approach. But it could also be a good idea to breathe in as you raise and out as you lower yourself. The two methods have nearly identical effects on blood pressure and heart rate. However, those who lift really big weights—like powerlifters—occasionally employ the breathing à la Valsalva technique. This is taking a deep breath, holding it in for the whole exercise, and bracing yourself using your lower back and abdominal muscles. After finishing the exercise or after doing several repetitions, air is released. Intraabdominal and intrathoracic pressures rise following the Valsalva movement. This improves the torso's structural integrity by guarding against excessive spinal flexion or extension and offering a stable foundation for safely and successfully lifting large weights. However, people with hypertension or those who faint easily may find the Valsalva method risky as it raises blood pressure, slows heart rate, and limits breathing (Fig 1).

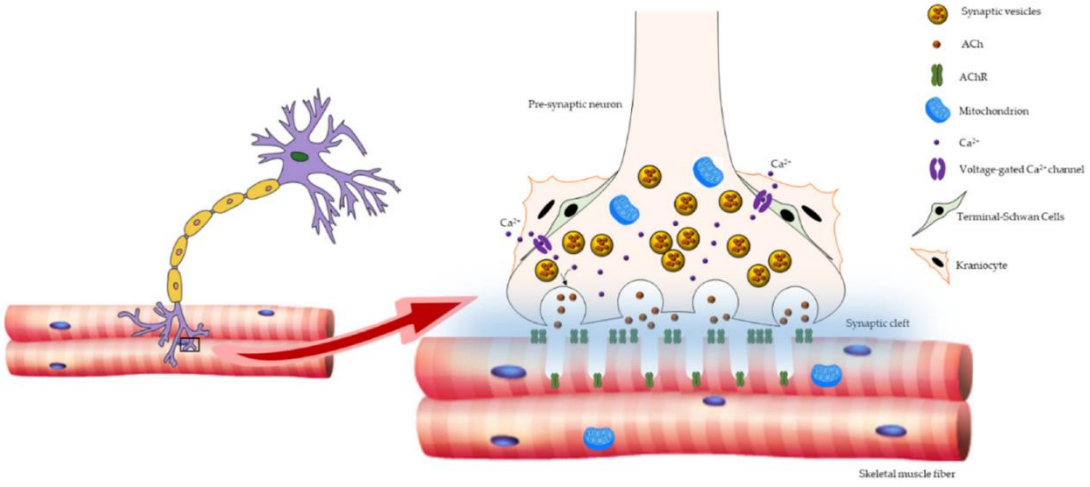

Figure 1: Hormonal neuromuscular insight

Table 3: Result of Correlations

CORRELATIONS						
		RESPONSE	**STRENGTH TRAINING**	**HORMONAL**	**NEUROMUSCULAR INSIGHTS**	**GENDER DIFFERENCES**
RESPONSE	Pearson Correlation	1	-.030	.118	.029	.309*
	Sig. (2-tailed)		.835	.408	.839	.028
	N	51	51	51	51	51
STRENGTH TRAINING	Pearson Correlation	-.030	1	-.386**	.098	-.269
	Sig. (2-tailed)	.835		.005	.496	.056
	N	51	51	51	51	51
HORMONAL	Pearson Correlation	.118	-.386**	1	.369**	.806**
	Sig. (2-tailed)	.408	.005		.008	.000
	N	51	51	51	51	51
NEUROMUSCULAR INSIGHTS	Pearson Correlation	.029	.098	.369**	1	.262
	Sig. (2-tailed)	.839	.496	.008		.063
	N	51	51	51	51	51
GENDER DIFFERENCES	Pearson Correlation	.309*	-.269	.806**	.262	1
	Sig. (2-tailed)	.028	.056	.000	.063	
	N	51	51	51	51	51

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The above result in the Table 3 demonstrate that correlation coefficient analysis result describe the Pearson correlation values the significant values also that number of observations of each variables included dependent and independent. The gender differences shows that 3%, 5% 100% and 6% significantly levels between them. the overall result demonstrates that

some positive and some negative relation between the independent factors and dependent variables.

2.2 Volume of training

Stated otherwise, the volume is the product of these values when a person moves a certain weight for a given number of repetitions, rests, and then repeats this procedure for a predetermined number of sets. Weightlifting-free exercises can replace the load with intensity, or the amount of work needed to complete the exercise. One of the most important factors affecting how successful strength training is is training volume. Hypertrophy and volume are positively correlated. The common practice is to normalise the load or intensity using the individual's one-repetition maximum (1RM) expressed as a percentage. The intensity limits the maximum number of repetitions that may be completed in a single set before muscle failure occurs. The intensity is linked to the chosen repetition ranges. Depending on the objective, various weights and amounts of repetition may be appropriate: Women are typically thought to possess between 40 and 75 percent of men's physical strength, and they are also known to possess less power than men with comparable training. It is common knowledge that equally trained males are stronger and more powerful than women athletes. When power per kg of body mass is taken into account, gender disparities in absolute strength are still discernible, with the upper body showing greater gender differences than the lower body. By contrast, a number of studies have shown that there are no appreciable differences between the sexes in terms of cross-sectional area or strength per unit of lean body mass. It is correct to state that the primary factor influencing gender variations in maximum strength is muscle mass. Further research found that while disparities in power performances persisted independent of muscle mass and body composition, gender differences in strength could still be explained by LBM. These findings lend credence to the theory that variations in lean body mass alone are insufficient to account for gender disparities in anaerobic power and leaping ability.

Table 4: Result of Test Statistics

TEST STATISTICS					
	RESPONSE	**STRENGTH TRAINING**	**HORMONAL**	**NEUROMUSCULAR INSIGHTS**	**GENDER DIFFERENCES**
CHI-SQUARE	24.824[a]	25.529[a]	20.118[a]	24.824[a]	24.471[a]
DF	2	2	2	2	2
ASYMP. SIG.	.000	.000	.000	.000	.000
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.0.					

The above result in the Table 4 describes that chi square analysis included test statistic values. The result describes those significant values of each variables included the dependent and independent.

The chi square rate of response and strength training is 24.824 and 25.529 its shows that positive chi square values. The hormonal and neuromuscular shows that 20.118 and 24.824 shows that positive chi square value between them. the gender difference shows that 24.471 positive value between them.

Table 5: Result of Paired Samples Statistics

PAIRED SAMPLES STATISTICS					
		MEAN	**N**	**STD. DEVIATION**	**STD. ERROR MEAN**
PAIR 1	Response	1.4314	51	.60844	.08520
	Neuromuscular Insights	1.4314	51	.57463	.08046
PAIR 2	Strength Training	1.4314	51	.53870	.07543
	Neuromuscular Insights	1.4314	51	.57463	.08046
PAIR 3	Hormonal	1.5882	51	.57189	.08008
	Neuromuscular Insights	1.4314	51	.57463	.08046
PAIR 4	Gender Differences	1.4510	51	.54088	.07574
	Neuromuscular Insights	1.4314	51	.57463	.08046

The above result in the Table 5 shows the paired sample statistic values of each pair, including the dependent and independent, are described by the above result. In the first set of results, the mean value is 1.4314, the standard deviation rate is 60%, and the standard error value of the mean rate is 8%. These are the results for response and neuromuscular insights, respectively. Strength training and neuromuscular insights results indicate that the second pair's standard deviation rates are 53% and 57%, respectively, from the mean.

The final set of insights, which are related to hormones and neuromuscular function, has a standard deviation value of 57% and a mean deviation of 54%, respectively. The neuromuscular insights result for the fourth pair, which relates to gender differences, indicates that the mean value is 1.4510, whereas 1.4314 indicates a positive average value. The corresponding standard deviation rates are 54% and 57%

2.3 Control Chart

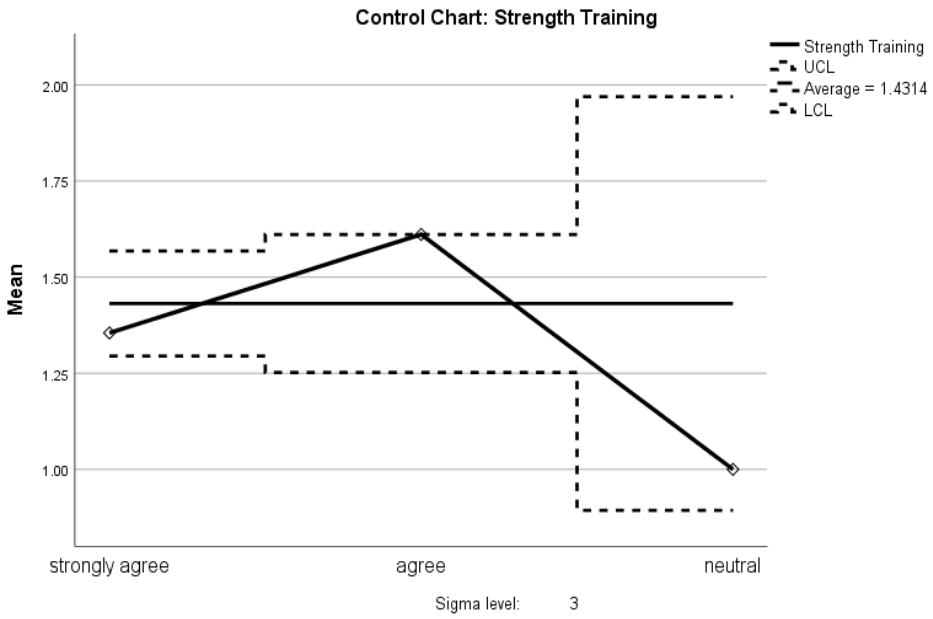

Figure 2: Control Chart

The above graph of figure 2 presents that control chart between the strength and neuromuscular the vertical side shows mean value its start from 1.00 and end at 2.00. the horizontal side shows that strongly agree, agree and neutral levels between them. the overall graph shows average value is 1.4314 between them its shows positive average rate.

3. Conclusion

In conclusion, based on body mass, lean body mass, and muscle thickness, the study's findings show that there are notable disparities in strength and power between male and female strength and power competitors. The current study also demonstrates that, in trained athletes, there are significant correlations between muscle architecture and strength and power performance. Specifically, there are strong relationships between bench press 1RM in both sexes and pectoral muscle thickness and power. One limitation of the study is that it was not possible to account for differences in lifting skills between men and women since lifting technique and muscle activation were not measured. The study's findings indicated a clear and substantial connection between strength training and gender differences. Another limitation might be modifying the 1RM of multi-joint exercises based on the thickness of a single muscle. Additionally, it's possible that the participants' strength and conditioning regimens from the years prior to this study varied in a variety of ways (number of upper and lower body exercises, frequency of training, periodisation model, etc.), and that these variations had a notable effect on the morphology and performance of the muscles.

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