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ORIGINAL

INVESTIGATING THE ROLE OF GENETIC TESTING IN TAILORING TRAINING PROGRAMS FOR FRENCH SWIMMERS

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ABSTRACT

In sports science, genetic testing has become a valuable tool for understanding the genetic foundations of athletic ability. This study investigates whether genetic testing may be used to customize training plans for French swimmers to optimize performance, reduce injury risk, and improve recovery. Coaches can determine genetic predispositions pertaining to muscle composition, metabolism, injury risk, and recovery capacity by analyzing the genetic profile of an athlete. With the use of this data, individualized training plans that target deficiencies, build on strengths and increase success rates in the pool may be created. The research was based on primary data analysis to determine whether the research used Smart PLS software and generated results, including descriptive statistics, and correlation coefficient analysis, which also explains the smart PLS Algorithm Model between them. Event specialization, dietary optimization, injury avoidance, recovery optimization, talent discovery, and long-term athlete development are some of the main uses of genetic testing. French swimming programs can acquire a competitive advantage and set up their athletes for success on the international scene by incorporating genetic information into coaching procedures. A discussion of the ethical issues surrounding the use of genetic data in sports is included, focusing on the value of informed consent and private rights. The overall research found the positive and significant role of genetic testing in tailoring training programs for French swimmers. Genetic testing has great potential to enhance training regimens and bring forth the hidden talent of French swimmers, solidifying France's standing as a dominant force in the world of competitive swimming.

KEYWORDS: Genetic Testing (GT); Tailoring Training Program (TTP); French

Swimmers (FS)

1. INTRODUCTION

In the conventional or systematic examination or research, the inquisition of something or someone is known as an investigation. So, it can also be defined as a ceremonial enquiry or orderly study. So, during an investigation, research or investigation is performed to gain knowledge about facts. Understanding a particular situation, event, or problem by accumulating information and evidence is known as an investigation. A complete and systematic analysis of the available information and facts also comes in the category of investigation. In genetic testing, a person's blood and other tissues are examined to know whether or not there is any change in their genetic material. Genetic testing is also beneficial in determining whether a genetic condition can be seen in that person (Sivonen & Jones, 1999). Genetic testing aims to see changes like mutations or variations in a person's DNA. Genetic testing is very helpful in various areas of medicine as a person's medical care can be changed on behalf of variations that happen in an individual. Normally, three methods can be used for genetic testing: cytogenetic testing, biogenetic testing, and molecular testing are involved (Frantz, Nischwitz, Compton, & Gordillo, 2023). These methods prove helpful in determining abnormalities that happen in the structure of chromosomes, the functioning of proteins, and the sequencing of DNA (Dergaa et al., 2023). Scientific research and the pursuit of athletic greatness have long been linked, pushing the limits of human ability and changing our knowledge of sports training techniques. With the development of genetic testing in recent years, personalized training regimens have become more accessible and have the potential to help athletes reach their full potential by customizing their regimens to suit their genetic makeup. This emerging discipline offers tremendous promise for competitive swimmers when even the smallest improvement might be the difference between success and failure. In competitive swimming, France boasts an illustrious record of producing elite swimmers who have triumphed in global events like the Olympics and World Championships. However, as competition across the world heats up and winning margins narrow, athletes and coaches are always looking for new methods to get an advantage. The use of genetic testing in training regimens is one approach that has attracted much interest, providing information on an athlete's genetic strengths, weaknesses, and predispositions. Genetic disorders within an individual can be diagnosed by a specific test, which can be an examination of chromosomes and DNA or a blood test for the identification of the functioning of some particular enzymes, whether they are functioning normally or in an abnormal manner.

The field of study of enzymes can be known as biochemical genetic testing. If the result of any test appears abnormal, it will represent that that specific person has some genetic disorder or may have a disease (Lenardo, Lo,

& Lucas, 2016). Genetic testing is conducted through chromosome studies, DNA studies, and biochemical genetic studies. Tests that are performed to determine the risk of cancer genes can be done by DNA studies. A program designed for a specific purpose is called a tailored training program. This training cannot be used for various purposes. It must be utilized for a specific thing. It is created for a specific and must be utilized for that specific thing as it is designed in such a way that it can only accomplish that specific goal(Martin, Wolcott, & O'Connell, 2020). Genetic testing offers a plethora of information about an individual's genetic makeup and is often carried out through the examination of DNA samples. This includes differences in genes linked to metabolism, oxygen consumption, muscle composition, risk of injury, and ability for recovery, among other things. Coaches and sports scientists want to customize training plans that maximize an athlete's performance while lowering the risk of injury and overtraining by interpreting these genetic patterns. The incorporation of genetic testing has great potential for French swimmers, whose performance in the water is crucial to their success on the global scene. Through an awareness of the genetic variables influencing characteristics like the composition of muscle fibers, aerobic potential, and lactate threshold, coaches may create training regimens that target particular areas of development and build on innate capabilities (Sun & Choi, 2023).

The use of genetic testing on breast cancer patients who come either from a lower education or have a poor background is very unreasonable. A conversation about genetic counselling seems to be very difficult for such people as they have a very low literacy rate and awareness about health issues, and they face cultural hurdles a lot. The aim of this research is the evaluation and development of training programs for the professionals of healthcare to increase effective conversation. A blended training program that is based on patients and healthcare professionals was developed in an orderly manner on behalf of their needs and preferences(Turner, 2016). Before the beginning of the training program the efficacy, knowledge, and awareness of healthcare professionals in analyzed. It can only be determined at the end of the training whether the training program was useful and acceptable or not. From 17 hospitals, healthcare professionals were investigated and they represent that they have moderate to high-level awareness and knowledge about the spread and effect of limited health literacy. There are certain factors which are related to culture that have an impact on communication(Lüffe et al., 2022). Such professionals are not confident enough they can analyze the reasons for the limited health literacy and efficiency of these individuals if talking with such patients is also very low. It becomes very difficult for healthcare professionals to communicate and understand the problems of patients who have having very low literacy rate about health and very poor background(Sharan, Nsamela, Leshner - Pérez, & Simmchen, 2021). Communication about Breast cancer genetic counseling can be improved by such type of training programs.

A medication that is known as Metformin is the most commonly used anti-diabetes. There are a lot of health benefits of this medicine. It decreases the danger of cardiovascular disease and cancer. It can bring improvement in cognitive functions with time and make it easy for the patient with diabetes to survive. As the outputs of Metformin is the most common drug that can be used as an anti-aging drug known as Targeting aging due to its health effects in French swimmers for the long duration of their lives. Outcomes of these medicines are strongly affected by genetic variations when the effects of metformin are analyzed on the health of the huge human population of French swimmers. As evolution is taking place step by step, people are moving from hunting and gathering to agriculture toward industrialization(Meignié et al., 2021). This evolution has had very extreme effects on the physical activity of humans. The physical activity patterns of human beings nowadays are extremely low as compared to previous patterns, along with a significant decrease in the physical activity of humans. Those health problems which are non-communicable and have affected human societies recently in a very bad way represent that their biggest reason is the physical activity patterns because these patterns are very different from those that are adopted by humans genetically(Ferhat et al., 2023).

The association between physical activity, health, and longevity is very old. All the Physicians have the mindset that a healthy body is necessary for mental fitness. They mentioned that excessive exercise will have deleterious effects on health so the French swimmers should do moderate physical activity. One of the Italian physicians who was the father of occupational medicine said that certain diseases develop harmful effects on various occupations. After research, he came to the point that professional messengers were runners most exceptionally. But they took care of themselves in such a way that they could never be caught by ant diseases like tailors and cobblers. This thing represents that ancestors were very conscious of physical fitness even a long time ago (Onken et al., 2022).

1.1 Research Objective

The main purpose of this study is to understand the role of genetic testing in tailoring training techniques within French swimmers. That is how much physical fitness is necessary for them so they are best in their occupation. The research determines and Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers. The research paper divided into five specific chapters first portion represent the introduction included genetic testing also tailoring training programs. The first section also present objective of research the second section describe literature review the third section represent that research methodology included tools and techniques. The fourth section describe that result and its descriptions the last portion summarized overall research and present recommendation related to

Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers.

2. Literature Review

Many behavioral activities of athletes impact their game-performing ability. researchers reveal that sports studies provides detail about athlete's sport performing ability. The sports performance of athletes in any sport is influenced by the athlete's behavioral pattern. also, in the twenty-first century, the sport-playing ability of athletes is dependent on certain socio-political factors along with genetic or behavioral patterns(Blair, 2019).studies suggest that athletes face a lot of challenges during their successful journey in the sports field. these challenges include game pressure and managing academic pressure along with other mental stressors. all these challenges impact the game-playing skills of college athletes.

To ensure that athletes' performance is not affected by these challenges athletes are monitored using the monitoring sensors. also, athletes are at higher risk of developing injuries during sports playing that can be assessed through advanced genetic testing monitors or biomarkers. This testing tracks or asses the genetic basis behind the injury and provides effective strategies to prevent injury (Bozzini, 2020).scholars suggest that in sports-playing children the assessment of the bimanual upper limb development holds significance in the tailoring-based rehabilitation programs or sessions, in monitoring programs as well as in evaluating the effectiveness of the rehabilitation process in athlete. the assessment of UL activity in children helps in predicting the onset of neurodevelopmental disorders in children .To track the developmental process in children the use of an inertial tracking system is made (Braito et al., 2018). Optimizing muscular performance is one of the main goals when creating training plans for French swimmers. Genetic differences affect the makeup of muscle fibers; some people are more likely to have a greater number of fast-twitch fibers, which are linked to explosive power and the capacity to sprint; others are more likely to have a higher proportion of slow-twitch fibers, which are better suited for endurance exercises. Coaches can tailor training regimens to improve the development of the right muscle fibers for a swimmer's event specialization—sprinting, middle-distance, or long-distance swimming—by detecting these genetic markers.

Moreover, genetic testing provides information on a person's metabolic profile, which clarifies how their body uses and processes energy while they exercise. Athletes' patterns of fuel utilization and endurance ability can be impacted by variations in metabolism-related genes, such as those involved in the metabolism of fat and carbohydrates. Equipped with this understanding, trainers may adjust dietary plans and exercise regimens to maximize energy availability and substrate utilization, which will enhance performance and

postpone the onset of tiredness during competitions. studies claim that paediatric narcolepsy is a disease that is prevalent in young children. It results in a sleep paralysis phenomenon. the paediatric narcolepsy disorder negatively impacts children's social interacting ability and develops problematic emotional behavior in them. The treatment of this disorder is possible through medications along with providing developing children with psychological interventions(Chung, Chin, Huang, & Wang, 2022).studies elaborate that to provide athletes with personalized healthcare services AI technology is used in health sectors. the sports athletes playing different intense sports are at risk of developing health problems and injuries.to assist such athletes, they are provided with personalized AI-based health services(Dergaa et al., 2023).studies suggest that PCD is a heterogenetic phenotypic disorder that is mostly an inherited disorder. This disorder in children arises due to early childhood respiratory track problems and due to the infection of airways, this disorder becomes severe in children that opt for swimming as their sport. Swimming sport can further worsen the infection of lungs in children having PCD disorder. To avoid the disorder severity children with PCD are provided with clinical based treatments at early age(Farley et al., 2018). Studies claim that genetic variation in people results in an alteration in their macronutrient intake. obesity caused in people due to genetic variation is tested through the genetic testing process.

After the genetic testing, the treatment of genetic obesity is carried out using the SYK inhibitor fostamatinib (Gkouskou et al., 2024).Scholars explain that behavioral activities in people are characterized by their neurobehavioral responses. the understanding of neurobehavioral phenotyping helps comprehend the mechanism of the development of diseases in humans(Harry et al., 2022). The children having ataxia are provided with exercise-based treatment therapies to treat their disease condition(Hartley et al., 2019). Studies show that nanogels are advanced nanoparticles comprising gels that have wide applications in various fields. the specific properties of micro gels and nanogels make their use efficient in tailoring programs and industries (Karg et al., 2019).scholar studies reveal that lateral elbow injury in tennis players is predicted through PRTEE. The French players affected with lateral epicondylitis are provided with PRTEE in French language so that they can explain their symptoms in French language (Kaux, Croisier, & Bruyère, 2018).studies explain that athletes training in higher altitudes show increases in HB levels. the chances of immunological disorder onset in athletes training at higher altitudes are higher. providing the athlete with a diet enriched with antioxidants maintains their iron requirement (Koivisto-Mørk, 2023).Studies claim that tour is an epigenetic disease that causes modulation of metabolic processes. the reason behind the onset of the tour is poor use of a carbohydrate-based diet. for tailoring the metabolism of the glucose pathway, the strategy associated with metabolic programming is used(Liu, 2019).studies explain that the relationship between an athlete's game-playing ability and his psychological health is

regarded as a symbiotic relationship.

The mental health of an athlete greatly influences his performance in sports. researchers explain that different sports induce the production of neurochemicals in the body of athlete. the athlete that indulge themselves in exercise based routines shows improved mood(Martín-Rodríguez et al., 2024). Genetic testing offers useful information not only about muscle function and metabolism but also about injury risk and probable recovery. Due to the repetitive nature of swimming, certain genetic variations have been linked to an increased vulnerability to particular types of injuries, such as tendon and ligament injuries. Coaches can reduce the risk of injury and extend an athlete's career by implementing customized strength and conditioning programs and biomechanical changes based on the identification of these hereditary predispositions. Furthermore, genetic testing can provide information on how well an athlete recovers from practice and competition, which can help with the development of recovery plans that maximize kinetics and reduce downtime.

Athletes' ability to recover can be influenced by differences in genes linked to inflammation, oxidative stress, and tissue repair; some athletes are more capable of recovering than others. Coaches may speed up recovery and make sure athletes are ready for contests and training sessions by customizing recovery tactics, such as hydration programs, sleep optimization approaches, and active recovery modalities. studies claim that different materials are manipulated at the nanoscale and are endangered to produce EML. These EMLs have applications in several fields.in most cases, biological systems are used for developing the EML at a large scale(Nguyen, Courchesne, Duraj - Thatte, Praveschotinunt, & Joshi, 2018).Studies reveal that the pace variability of elite swimmers is determined using the swimmer pacing assessment strategies. the CSV and other variables associated with the swimmer athletes are predicted using various elite swimmers' pacing methodologies. The pacing strategies predict that fatigue in swimmers impacts their performing kinetics negatively (López-Belmonte et al., 2023).studies suggest that front crawl swimming activity is predicted using interrail measuring technology. the movement of upper limbs in swimmers is detected through the help of inertial measuring technology (Regaieg, Létocart, Bosche, Seifert, & Guignard, 2023) also, athletes' movement in sports is detectable through the help of wearable technology.by measuring the lactate level in an athlete's sweat the wearable sensors provide details about the athlete's sports performing skills.

The tailoring training in athletes is highly dependent on the lactate threshold. the electrochemical sensors are employed for detecting the lactate level by assessing the enzymatic reactions. in the sports field lactate, sweat monitoring devices hold great applications(Yang, Hong, & Park, 2024).studies reveal that the coordination between the trunk, as well as arm muscles of swimmers, determines their speed in water while swimming. Inter-segmental

coordination is observed in Paralympic swimmers. By understanding the genetic basis behind the coordination patterns observed in different swimmers, it becomes easy to optimize the swimming performance of swimmers (Zhou et al., 2023). researchers predicts that female swimmers undergo menstrual cycle once in a month during which they cannot dive into the water or cannot swim. for supporting female athletes to avoid swimming during menstruation cycle better commutation and understanding is developed between coaches and swimmers. coaches are educated about the menstrual cycle for the purpose of making swimmer athlete swimming sport experience better (Zipp & Hyde, 2024).

3. Methodology

The research study determines and Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers. The research based on primary data analysis for gathering the data used different questions related to variables included dependent and independent. For measuring the research used Smart PLS software and generate result included descriptive statistic, correlation coefficient, also smart PLS Algorithm Model between them.

3.1 Smart PLS Algorithm Model

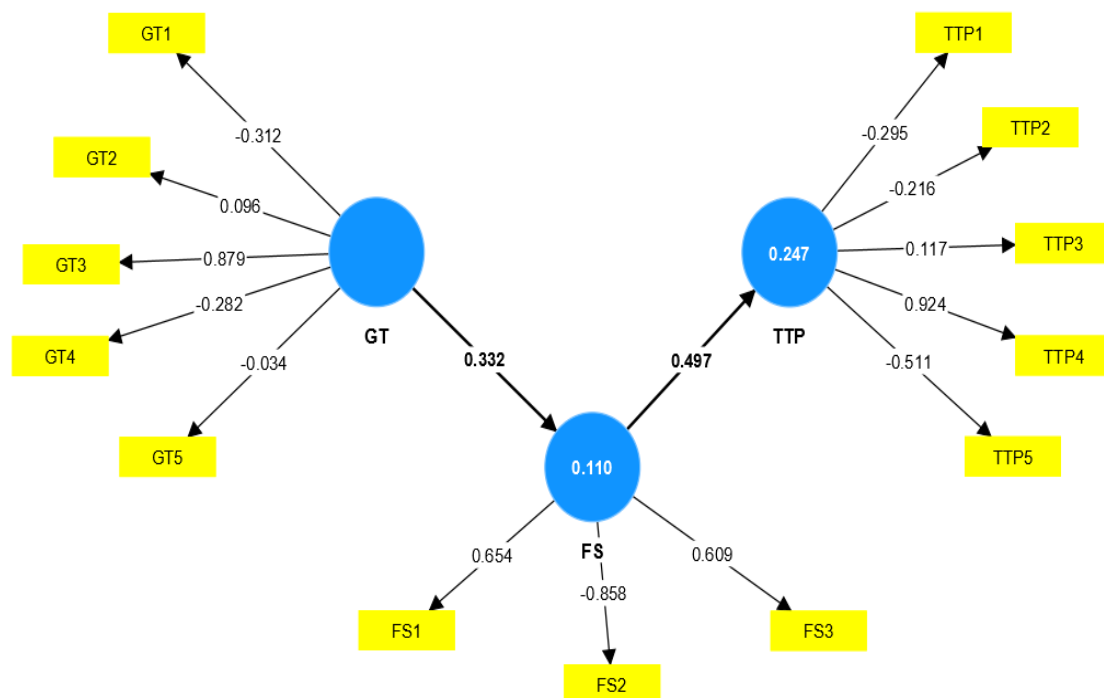


Figure 1

The above model represents that smart PLS Algorithm model in between GT and FS also TTP the model shows that -0.312, 0.096, 0.879, -0.282, -0.034 its shows that negative but 31%, 9%, 87%, 28% and 3% significant rate between them. the FS shows that 0.654, -0.858 and 0.609 its shows 60%, 85%

and 65% significant rates between them. the TTP shows that -0.295, -0.216, 0.117, 0.924 and -0.511 shows negative and positive rates between them.

3.2 Descriptive Statistic

Table 1

NAME	NO.	MEAN	MEDIAN	SCALE MIN	SCALE MAX	STANDARD DEVIATION	EXCESS KURTOSIS	SKEWNESS	CRAMÉR-VON MISES P VALUE
GT1	0	1.531	1.000	1.000	3.000	0.610	-0.404	0.716	0.000
GT2	1	1.490	1.000	1.000	3.000	0.643	-0.070	0.991	0.000
GT3	2	1.531	1.000	1.000	3.000	0.575	-0.634	0.541	0.000
GT4	3	1.571	2.000	1.000	3.000	0.571	-0.734	0.387	0.000
GT5	4	1.531	1.000	1.000	3.000	0.642	-0.311	0.837	0.000
TTP1	5	1.429	1.000	1.000	3.000	0.535	-0.671	0.709	0.000
TTP2	6	1.612	1.000	1.000	3.000	0.723	-0.715	0.761	0.000
TTP3	7	1.837	2.000	1.000	3.000	0.710	-0.982	0.254	0.000
TTP4	8	1.469	1.000	1.000	3.000	0.575	-0.329	0.788	0.000
TTP5	9	2.163	2.000	1.000	5.000	0.889	1.222	0.925	0.000
FS1	10	1.694	2.000	1.000	3.000	0.706	-0.855	0.528	0.000
FS2	11	1.592	2.000	1.000	3.000	0.531	-1.135	0.039	0.000
FS3	12	1.612	2.000	1.000	3.000	0.664	-0.597	0.648	0.000

The above result represent that descriptive statistical analysis result describe mean values, median rates, also that explain the standard deviation rates of each variable included dependent and independent. The result describes that skewness values, probability values of each variable the GT1,2,3,4,5 its shows that mean values is 1.531, 1.490, 1.531, 1.571 also that 1.531 these are all shows that positive average value of mean. The standard deviation rate is 0.610, 0.643, 0.575, 0.642 its shows that 61%, 64%,57% and 64% deviate from mean. The skewness values of GT is 71%, 99%, 54%, 38% and 83% skeness rates of each factors.

According to the result overall probability value is 0.000 shows that 100% significant level between them. the TTP1,2,3,4 and 5 its consider as mediator variable according to the result its mean values are 1.429, 1.612, 1.837, 1.469 also that 2.162 these are shows that positive average value of mean. The standard deviation rates of mediator variables are 53%, 72%, 71%, 57% and 88% deviate from mean.

The FS1,2,3 are considered as dependent variables according to the result mean values are 1.694, 1.592, and 1.612. These all show positive average values of the mean. The standard deviation rate is 70%, 53% and 66% deviate from mean. According to the result overall minimum value is 1.000 the maximum value is 3.000 the mediation rate is 2.000 respectively.

3.2.1 Application

Genetic testing has a wide range of uses in athlete development and performance enhancement, including customizing training regimens for French swimmers. Among the important applications are:

1. Customized Training Plans: Coaches may create training plans that are specific to the genetic makeup of each swimmer due to DNA testing. Coaches can tailor training regimens to maximize strengths, fix deficiencies, and reduce injury risk by detecting genetic predispositions linked to muscle composition, metabolism, and injury risk.

2. Event Specialization: Genetic testing may be used to determine if a swimmer is genetically inclined to compete in a particular event, such as long-distance, middle-distance, or sprint swimming. Coaches can use this information to direct athletes towards competitions where their genetic composition suggests they would perform well, therefore optimizing their chances of success.

3. Nutritional Optimization: Athletes' dietary requirements and fuel-use habits might be impacted by genetic variants linked to metabolism. Through an awareness of these genetic characteristics, coaches may create individualized nutrition programs that best suit the genetic profile of each swimmer, maximizing substrate utilization and energy availability to enhance both performance and recovery.

4. Injury Prevention: Genetic testing is able to detect genetic markers linked to a higher chance of certain types of injuries, such as ligament and tendon injuries. Equipped with this understanding, coaches may execute focused injury avoidance tactics, such strength and conditioning regimens and biomechanical modifications, to reduce the likelihood of injuries and extend an athlete's career.

5. Recovery Optimization: An athlete's ability to recover can be impacted by genetic variances linked to oxidative stress, inflammation, and tissue repair. Coaches can maximize recovery kinetics, reduce downtime, and make sure athletes are ready for upcoming training sessions and competitions by customizing recovery tactics based on genetic information.

6. Talent Identification: By evaluating a swimmer's genetic inclinations towards important performance characteristics, genetic testing might help identify potential young swimmers early on. Talent scouts and coaches may use this information to find athletes who have the most potential for success and provide them specialized options for growth and assistance.

7. Long-term Athlete growth: By pinpointing areas that require attention and growth over the course of an athlete's career, genetic testing may help guide long-term athlete development strategies. Athletes can continue to develop and realize their full potential over time if trainers periodically reevaluate genetic profiles and modify training regimens accordingly.

3.3 Correlation Coefficient

Table 2

	GT1	GT2	GT3	GT4	GT5	TTP1	TTP2	TTP3	TTP4	TTP5	FS1	FS2	FS3
FS1	-0.002	-0.074	0.099	-0.224	0.178	0.023	0.087	-0.018	0.203	-0.018	1.000	0.000	0.000
FS2	-0.087	-0.072	-0.226	0.029	0.216	0.185	0.172	-0.123	-0.508	0.141	-0.333	1.000	0.000
FS3	-0.197	0.110	0.218	-0.115	0.195	0.008	-0.143	-0.004	0.156	-0.169	0.487	-0.159	1.000
GT1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GT2	0.014	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GT3	-0.279	-0.206	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GT4	-0.050	0.016	0.071	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GT5	0.167	-0.185	0.011	-0.381	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TTP1	-0.134	-0.136	-0.009	0.334	-0.068	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TTP2	0.096	-0.162	0.053	-0.106	-0.084	-0.045	1.000	0.000	0.000	0.000	0.000	0.000	0.000
TTP3	0.153	0.265	-0.388	-0.122	-0.079	0.023	-0.084	1.000	0.000	0.000	0.000	0.000	0.000
TTP4	-0.070	-0.070	0.358	0.053	-0.232	-0.123	-0.004	0.038	1.000	0.000	0.000	0.000	0.000
TTP5	0.255	0.217	-0.489	0.138	-0.116	0.025	-0.187	0.236	-0.390	1.000	0.000	0.000	0.000

The above result describes that correlation coefficient analysis related to Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers. The overall result shows some negative and some positive also significant link between dependent and independent variables. the TTP2,3,4,5 shows that -0.070, 0.358, -0.232, -0.123, -0.004, -0.187 shows negative but 12%, 4%, 18% significant interrelation between them.

4. Conclusion

Genetic testing has been included into French swimmers' training regimens, which is a novel way to maximize physical capabilities and boost competitive outcomes. Coaches and sports scientists may learn a great deal about the underlying genetic elements that determine attributes like muscular performance, metabolism, injury risk, and recovery capacity by analyzing an athlete's genetic profile. Equipped with this understanding, customized training regimens may be crafted to use innate abilities, rectify deficiencies, and reduce the likelihood of harm, thereby optimizing prospects for achievement in the aquatic realm. Although genetic testing has great potential for sports training, it is important to understand that it is not a cure-all. Genetic data should be seen as an additional component to performance analysis, physiological testing, and conventional coaching techniques.

In addition, it is imperative to thoroughly evaluate the ethical implications of using genetic data in sports, guaranteeing the protection of individuals' privacy and giving athletes the ability to make knowledgeable choices regarding their training and involvement. All things considered, the use of genetic testing to customize training plans for French swimmers provides a thorough approach to athlete development and performance improvement by utilizing state-of-the-art research to maximize training, nutrition, injury prevention, and recuperation techniques. The research based on primary data analysis for determine the research used smart PLS software and generate informative result included descriptive statistic, correlation coefficient analysis also that explain the smart PLS Algorithm model for measuring and investigate the Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers.

French swimming programs can acquire a competitive advantage and set up their athletes for success on the international scene by incorporating genetic information into coaching procedures. To sum up, the incorporation of genetic testing into training regimens signifies a revolutionary development in the sports science domain, providing hitherto unseen comprehension of the genetic foundations of athletic achievement. Leveraging genetic testing has enormous promise for French swimmers who aim to participate at the top levels of international competition in terms of optimizing training regimens and maximizing results. Coaches can unleash the latent potential in every athlete by using genetic information, which will help them succeed in the water and

solidify France's standing as a dominant force in the world of competitive swimming. Future developments in genetic testing for sports training should be possible due to continuous study, technical advancements, and cooperation between scientists, coaches, and players. With a deeper knowledge of the genetic foundation of athletic performance, we will be able to more precisely and effectively customize training regimens. The overall research concluded that direct and significantly Investigating the Role of Genetic Testing in Tailoring Training Programs for French Swimmers. The use of DNA testing has the potential to enable French swimmers—who represent the epitome of quality and perseverance—to reach unprecedented heights of performance and solidify their reputation as swimming champions. By adopting this innovative strategy, France can maintain its position as a leader in the quest for sports excellence and encourage next generations of athletes to push the frontier of human performance and reimagine what is achievable in the water.

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