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Relationship Between Anthropometric Variables, Motor Fitness Components And Performance of Under-19 Fencers

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Abstract:

The purpose of the present study was to investigate the relationship between selected anthropometric measurements and motor fitness components with the performance of under-19 fencing players. Fifteen male fencers who represented the Amravati Division at the Maharashtra State Level Fencing Tournament were selected randomly as subjects. Anthropometric variables included height, body weight, leg length, and arm length. Motor fitness components assessed were agility, muscular endurance, and neuromuscular coordination. Fencing performance was evaluated through standardized fencing skill tests. Pearson's Product Moment Correlation was used to determine the relationship between selected variables and fencing performance. The level of significance was set at 0.05. The results revealed significant relationships between fencing performance and leg length (r = 0.520), arm length (r = 0.551), agility (r = –0.535), muscular endurance (r = 0.565), and neuromuscular coordination (r = 0.531). Height, body weight, and speed showed no significant relationship with fencing performance. The findings suggest that specific anthropometric characteristics and motor fitness components play a vital role in fencing performance.

Keywords: *Anthropometric Variables, Motor Fitness, Fencing Performance.*

Introduction:

Fencing is a dynamic combat sport requiring speed, precision, coordination, balance, and tactical intelligence. Performance in fencing depends not only on technical skill but also on physical and physiological attributes such as body dimensions, agility, muscular endurance, and neuromuscular coordination. Due to the nature of fencing movements lunges, retreats, advances, and rapid directional changes—certain anthropometric and motor fitness characteristics may provide a competitive advantage.

Modern fencing uses electrical scoring systems, introduced for epee in 1936, foil in 1956, and sabre in 1992, to ensure accurate judgment of touches. Despite advancements in scoring technology, physical efficiency remains a determining factor for success. Longer limb length may allow better reach, while agility and coordination assist in executing attacks and defences effectively.

Understanding the relationship between anthropometric measurements, motor fitness components, and fencing performance can help coaches and trainers in talent identification and training program design. Hence, the present study was undertaken to explore these relationships among under-19 state-level fencing players.

Purpose of the Study

The main purpose of the study was to determine the relationship between selected anthropometric measurements and motor fitness components with the performance of under-19 fencing players.

Delimitations of the Study

The study was delimited to:

- Under-19 male fencing players representing Amravati Division
- Fifteen subjects who participated at the Maharashtra State Level Tournament
- Selected anthropometric variables: height, weight, leg length, arm length
- Selected motor fitness components: speed, agility, muscular endurance, and neuromuscular coordination

Methodology

Subjects

Fifteen under-19 fencing players who participated in the Maharashtra State Level Fencing Tournament were selected randomly for the study.

Selection of Variables and Tests

Anthropometric Measurements

- **Height:** Measured using a stadiometer (cm)
- **Body Weight:** Measured using a weighing machine (kg)
- **Leg Length:** Measured using a flexible steel tape (cm)
- **Arm Length:** Measured using a flexible steel tape (cm)

Motor Fitness Components

- **Speed:** Measured by 50-meter dash
- **Agility:** Measured by 4 × 10-yard shuttle run (seconds)
- **Muscular Endurance:** Bent-knee sit-ups performed in one minute
- **Neuromuscular Coordination:** Assessed through fencing coordination tests

Fencing Performance Test

Performance was assessed using the following fencing skill tests (30 seconds each):

- Execution speed of advance and retreat from on-guard position
- Hitting on the target
- Repetition of the lunge

Statistical Procedure

Pearson's Product Moment Correlation coefficient was applied to determine the relationship between selected anthropometric and motor fitness variables with fencing performance. The level of significance was set at 0.05. The tabulated value of *r* at 0.05 level for 13 degrees of freedom was 0.514.

Results

Relationship between Fencing Performance and Selected Variables

Sr. No.	Variables Correlated	R-value
1	Height	0.113
2	Weight	0.012
3	Leg Length	0.520*
4	Arm Length	0.551*
5	Speed (50 m)	0.165
6	Agility	–0.535*
7	Muscular Endurance	0.565*
8	Neuromuscular Coordination	0.531*

Significant at 0.05 level

Discussion

The findings of the study revealed that leg length, arm length, agility, muscular endurance, and neuromuscular coordination had significant relationships with fencing performance. Longer leg and arm length may provide biomechanical advantages such as greater reach and efficient lunging ability. Agility enables fencers to change direction quickly within a limited space, which is essential during offensive and defensive actions.

Muscular endurance plays a vital role in sustaining repeated contractions during prolonged bouts, while neuromuscular coordination enhances the synchronization of eye-hand and eye-foot movements required for precise attacks and defences. Height, body weight, and straight-line speed did not show significant relationships with performance, indicating that fencing relies more on specific physical attributes rather than general body size or sprinting ability.

Conclusions

Based on the results and within the limitations of the study, the following conclusions were drawn:

- Anthropometric variables such as leg length and arm length significantly contribute to fencing performance.
- Motor fitness components including agility, muscular endurance, and neuromuscular coordination are crucial determinants of fencing performance.
- Height, body weight, and speed (50-meter dash) do not significantly influence fencing performance in under-19 players.

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