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Effect of Strength and Conditioning on Skill-Related Fitness Among Men Futsal Players: A Systematic Literature Review

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I. Introduction

Futsal is a high-intensity indoor sport characterised by repeated accelerations, rapid changes of direction, and continuous technical involvement within a confined playing area. Unlike outdoor football, futsal imposes unique neuromuscular and physiological demands due to its smaller court size, faster tempo, and harder playing surface. These characteristics require players to develop high levels of skill-related fitness components such as agility, speed, power, balance, coordination, and reaction time. Despite these differences, many conditioning programmes applied to futsal athletes are adapted directly from outdoor football models, which may not fully address the sport's specific demands.

Recent research highlights the growing interest in strength and conditioning (S&C) interventions as tools to enhance performance and reduce injury risk in intermittent sports. However, findings in futsal remain fragmented due to variations in training modalities, testing protocols, and participant characteristics. Additionally, inconsistent methodological quality across studies makes it difficult for coaches and practitioners to identify the most effective conditioning strategies for young futsal players.

II. Methods

A systematic review methodology was adopted following structured search and screening procedures. Relevant studies were identified through electronic databases using predefined keywords related to futsal, strength and conditioning, and skill-related fitness. Inclusion criteria required experimental or quasi-experimental studies involving futsal players exposed to structured S&C interventions with pre- and post-intervention outcomes. A total of 12 studies involving 327 participants met the eligibility criteria. Interventions ranged from four to twelve weeks, typically consisting of two to three weekly training sessions. Programmes included resistance training, plyometrics, speed and agility drills, and combined training models. Study quality was evaluated using standard appraisal frameworks, and findings were synthesised narratively due to methodological heterogeneity.

III. Results and Discussion

Many reviewed studies demonstrated significant improvements in agility following structured strength and conditioning interventions. Players consistently showed faster change-of-direction performance in post-tests compared to baseline assessments. These improvements were linked to multidirectional plyometric drills and neuromuscular training that enhanced eccentric strength and intermuscular coordination. Recent sport science literature highlights that sport-specific plyometric and agility-based conditioning improves braking ability and directional efficiency in small-sided sports [5][6] These findings support the role of targeted S&C programmes in improving agility performance among futsal players.

Moderate improvements in balance and coordination were observed across several interventions, particularly those integrating core stability and proprioceptive exercises. Enhanced postural stability and improved motor control were reported in studies incorporating unstable surface training and neuromuscular control drills. Recent evidence suggests that neuromuscular training improves sensorimotor integration and dynamic stability in team sports [3]. However, variability in effect sizes across studies suggests that longer intervention periods may be required to achieve substantial improvements in balance and coordination among futsal players.

Speed and power demonstrated the most consistent improvements across the reviewed literature. Players exhibited faster sprint times and enhanced explosive performance in vertical jump and repeated sprint-tests following S&C interventions. These adaptations are commonly associated with increased lower-limb strength and improved rate of force development resulting from resistance and plyometric training. Recent systematic reviews confirm that combined strength–plyometric training significantly enhances sprint acceleration and explosive power in intermittent sport athletes [3][4]. Given the high-intensity intermittent demands of futsal, improvements in speed and power are critical for repeated sprint performance and match transitions.

Reaction time showed smaller, yet meaningful improvements compared with other fitness components. Studies incorporating reactive agility

drills and perceptual-motor training reported faster responses to visual stimuli following training interventions. These adaptations are likely influenced by improvements in neuromuscular readiness and perceptual-cognitive processing. Emerging research indicates that integrating cognitive-motor training with physical conditioning enhances decision-making speed and responsiveness in fast-paced sports [1][2] However, the limited number of futsal-specific studies highlights the need for further research focusing on perceptual training in indoor team sports.

Despite increasing interest in strength and conditioning (S&C) for futsal, several gaps remain in the literature. Many studies focus on general team-sport athletes rather than futsal-specific populations, limiting sport-specific applicability. Additionally, previous research often examines isolated performance components, with limited integrative evidence on how S&C programmes influence multiple attributes, such as agility, coordination, and power, simultaneously. Most interventions are also short term, providing insufficient insight into long-term adaptations. Furthermore, there is a lack of research involving Asian futsal players, reducing regional relevance. Therefore, this study addresses these gaps by evaluating the effects of a structured S&C programme on multiple performance components among futsal players.

IV. Conclusions

This systematic review demonstrates that strength and conditioning interventions can improve key skill-related fitness components among male futsal players, particularly agility, speed, and power. However, evidence remains limited for balance, coordination, and reaction time due to insufficient data. Future research should employ larger samples, longer intervention periods, and standardised testing protocols to strengthen the evidence base and support the development of futsal-specific conditioning guidelines.

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