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Predictive contribution of finger-hand grip strength and eye–hand coordination to overhead passing performance: a multiple regression study in novice volleyball players

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ABSTRACT

This study examined the independent and combined contributions of finger-hand grip strength and eye–hand coordination to overhead passing ability among undergraduate students enrolled in a Basic Volleyball Skills course. A quantitative correlational design was employed with 20 male students (from a population of 27) selected through purposive sampling to control for sex-related physical variance. Finger-hand grip strength was measured with a hand-grip dynamometer, eye–hand coordination with a 30-second wall-toss test, and overhead passing ability with a 60-second standardized passing test. Data were analyzed descriptively and inferentially using Shapiro–Wilk normality tests, Pearson product-moment correlation, and multiple correlation/regression in IBM SPSS Statistics (version 26). All variables were normally distributed ($p > 0.05$). Finger-hand grip strength showed a very strong, significant positive correlation with overhead passing ability ($r = 0.891$, $p < 0.001$, $R^2 = 0.794$), while eye–hand coordination showed a strong, significant positive correlation ($r = 0.638$, $p = 0.002$, $R^2 = 0.407$). Jointly, the two predictors explained 90.7% of the variance in passing performance ($R = 0.952$, $R^2 = 0.907$, $F(2,17) = 82.90$, $p < 0.001$), with grip strength contributing the larger standardized weight ($\beta = 0.759$) relative to coordination ($\beta = 0.362$). These findings extend biomechanical models of ball-contact control to a novel population. The research design being correlational in nature, one should see them mainly as a sign that pre-service coaching volleyball teachers could possibly benefit from adding finger-strength and coordination training to their training programs. Of course, this remains true as long as intervention studies confirm it. The study didn't include reliability coefficients for the three measures and also did not carry out the power analysis. These facts point to a limitation of the research.

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Introduction

Volleyball is a globally practiced team sport in which ball possession is limited to three contacts per side, placing a premium on the technical precision of every touch (Salsabila et al., 2023). Among the four foundational techniques serve, pass, spike, and block the overhead pass (commonly termed the "set" or "overhead pass") occupies a pivotal position because it converts a controlled reception into an attackable ball, directly shaping a team's offensive tempo (Fajri et al., 2023; Tobias, 2023). Because the overhead pass is executed with the fingertips above the head, its quality is inseparable from two physical–motor capacities: the strength of the finger and hand musculature that cushions and redirects the ball, and the eye–hand

coordination that allows a player to anticipate the ball's trajectory and align the hands precisely at the moment of contact (Winarno et al., 2013).

A growing body of research has linked physical conditioning to passing performance. Herman (2019) reported that arm strength, eye–hand coordination, and balance jointly predicted underhand passing accuracy among Indonesian high-school students, while Harefa et al. (2026) concluded that motor coordination, muscular strength, concentration, and training method collectively determine mastery of volleyball fundamentals.

International evidence corroborates this physical–technical link: Apidogo et al. (2021) demonstrated that motor-learning conditions shape multi-skill acquisition in volleyball, Batez et al. (2021) showed that structured pedagogical models improve skill execution and enjoyment among adolescents, and Dong et al. (2024) found that upper- versus lower-extremity contribution to overhead passing shifts systematically with passing distance, underscoring that hand-segment mechanics are distance- and task-dependent rather than fixed. Coordination-specific evidence is similarly consistent: Oktaviati et al. (2024) linked eye–hand coordination and self-confidence to overhead passing skill, and Nam (2025) documented persistent technical deficiencies in overhead passing among specialized volleyball students despite formal training, implicating unresolved coordinative and strength limitations.

Despite this convergence of evidence, three gaps remain. First, most existing studies operationalize "arm strength" or generic "hand strength" rather than isolating finger-hand grip strength, even though the overhead pass is executed primarily through fingertip contact rather than whole-arm force production (Suparman et al., 2021; Ishak et al., 2023; Juhanis et al., 2023). Second, the population base of prior work is overwhelmingly composed of school-age athletes or extracurricular club members (e.g., Syafrizal, 2020; Melly Aulia Muzaemah, 2024; Indra, 2026), leaving undergraduate coaching students who must simultaneously master and later teach the skill empirically underrepresented. Third, physical predictors have typically been examined in isolation rather than jointly, limiting the field's understanding of their relative and combined explanatory power (Ertanto et al., 2021; Amalia et al., 2023).

The present study addresses these gaps by (a) isolating finger-hand grip strength as a construct distinct from generalized arm or hand strength, (b) sampling undergraduate coaching students as an ecologically distinct and pedagogically relevant population, and (c) modeling both variables simultaneously through multiple correlation to quantify their independent and joint contributions. This combination of construct specificity, population novelty, and simultaneous modeling constitutes the study's principal contribution to the sport-science literature on fundamental volleyball skills. To better convey the details of the design explicitly, we are doing an observational (ex post facto) correlational study, as contrasted with an experimental or intervention trial; both predictors were assessed by field protocols that are well validated (e.g., grip strength: Widiastuti, 2017; wall-toss coordination: 2014 SBMPTN protocol).

However, reliability for the present sample has not been assessed and a lack of such reliability might be a limitation for the study. Further, from a theoretical view, the study is anchored in Newell's (1986) constraints-based model of motor coordination and the more general framework of motor-learning from Schmidt et al. (2019). Altogether those models expect that force-production (grip strength) and perceptual-motor (coordination) constraints operate jointly, rather than separately, to determine skilled performance, a notion that the present multiple-regression design intended to test directly and in the context of motor coordination rather than merely reproducing earlier bivariate correlational studies.

Accordingly, this study aimed to determine (1) the contribution of finger-hand grip strength to overhead passing ability, (2) the contribution of eye–hand coordination to overhead passing ability, and (3) the joint contribution of both variables to overhead passing ability among undergraduate students enrolled in a Basic Volleyball Skills course. Based on the theoretical and empirical rationale above, it was hypothesized that both predictors would relate positively and significantly to passing performance, individually and in combination.

Method

Research Design

This study used a quantitative correlational design to examine the contribution of two independent variables finger-hand grip strength (X1) and eye–hand coordination (X2) to one dependent variable, overhead passing ability (Y), following an ex post facto measurement approach without experimental manipulation.

Participants

The population comprised all 27 students enrolled in the Basic Volleyball Skills course, Department of Coaching, Faculty of Sport Science, Universitas Negeri Padang (20 male, 7 female). A purposive sample of 20 male students was selected to remove sex as a confounding source of physical-performance variance, consistent with prior designs isolating single-sex cohorts to strengthen internal validity (Batez et al., 2021). Data collection took place at the university volleyball court (GOR UNP) in June 2026 under institutional research permission. No formal sample size calculation or power analysis was performed before the study. The end up with a small sample (n = 20) which is less than the often quoted recommended number 10, 15 observations per predictive variable for regression with 2 predictors, and the effect of such low number of observations on the statistical power is discussed in the article as a limitation.

Instruments and Procedures

Finger-hand grip strength (X1) was assessed using a hand-grip dynamometer following the protocol of Widiastuti (2017): each participant performed three trials with the dominant hand, and the best of three attempts (kg) was retained for analysis, classified against normative grip-strength bands (Sangat Baik/Excellent > 55 kg; Baik/Good 46–55 kg; Sedang/Moderate 36–45 kg; Kurang/Below Average 26–35 kg; Sangat Kurang/Poor < 26 kg). Eye–hand coordination (X2) was assessed with a 30-second wall-toss (throw-and-catch) test adapted from the 2014 Indonesian Joint University Entrance Selection (SBMPTN) protocol. Participants stood 2 m from a wall and threw a tennis ball against a 2.5 m-high rebound target, catching the return with the non-throwing hand; three 30-second trials were administered, and the highest successful-catch count was retained.

Overhead passing ability (Y) was measured using a standardized 60-second continuous overhead-pass test. Participants self-tossed the ball and repeatedly passed it above a marked height threshold (2.30 m for men) within a 4.5 × 4.5 m area; two testers jointly timed the trial and tallied technically valid passes, with passes made while both feet were outside the test area excluded. These three tools all adhere to the field-testing procedures that have been commonly adopted (Widiastuti, 2017; SBMPTN, 2014) and employ the scoring method of highest among the three attempts, which aims to decrease the error of measurement. Furthermore, the overhead-passing test was rated by the two testers collaboratively in order to ensure that both have consistent opinions. The authors, however, failed to calculate the conventional reliability coefficients (for instance, test-retest, inter-rater kappa, Cronbach's alpha) of the current dataset, and they consider it as a limitation for the paper, as it is pointed out in the Discussion section.

Data Analysis

Data were analyzed with IBM SPSS Statistics version 26. Descriptive statistics (mean, standard deviation, range, variance) characterized each variable. Because the sample size was below 50, normality was evaluated with the Shapiro–Wilk test ($\alpha = 0.05$). Pearson product-moment correlation quantified the bivariate association of each predictor with passing ability, and multiple correlation/regression quantified the combined contribution of both predictors, with the coefficient of determination (R^2) interpreted as the percentage variance explained. Statistical significance was set at $p < 0.05$, and correlation magnitudes were interpreted using the Sugiyono (2010) benchmark (0.80–1.00 very strong; 0.60–0.79 strong; 0.40–0.59 moderate; 0.20–0.39 weak; 0.00–0.19 very weak).

Ethical Considerations

The study was conducted with institutional research clearance from the Faculty of Sport Science, Universitas Negeri Padang (research permit no. 4016/UN35.3/AK/2026), and all participants provided informed consent prior to testing.

Results and Discussions

Descriptive Statistics

Table 1 summarizes the descriptive statistics for the three study variables among the 20 participants.

Table 1. Descriptive statistics of finger-hand grip strength, eye–hand coordination, and overhead passing ability (N = 20)

Variable	N	Min	Max	Range	Mean	SD
Finger-hand grip strength (kg)	20	24.00	64.00	40.00	45.30	11.87

Eye–hand coordination (catches)	20	13.00	57.00	44.00	32.10	11.23
Overhead passing ability (score)	20	16.00	64.00	48.00	41.35	13.85

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Normality Test. Shapiro–Wilk tests confirmed that all three variables were normally distributed, satisfying the assumption required for parametric correlation analysis (Table 2).

Table 2. Shapiro–Wilk normality test results

Variable	Shapiro–Wilk Statistic	Sig.
Finger-hand grip strength	0.970 (df = 20)	0.765
Eye–hand coordination	0.981 (df = 20)	0.952
Overhead passing ability	0.973 (df = 20)	0.808

.Bivariate Correlations. Pearson product-moment correlation showed that finger-hand grip strength was very strongly and significantly associated with overhead passing ability ($r = 0.891$, $p < 0.001$), accounting for 79.4% of its variance. Eye–hand coordination was strongly and significantly associated with overhead passing ability ($r = 0.638$, $p = 0.002$), accounting for 40.7% of its variance (Table 3). Based on the reported r and sample size, 95% confidence intervals (Fisher z) were 0.74 to 0.96 for grip strength and 0.27 to 0.84 for coordination; the wider interval for coordination reflects the smaller sample and should temper confidence in the precise magnitude of that association.

Table 3. Bivariate Pearson correlations between predictors and overhead passing ability.

Predictor	r	Sig. (2-tailed)	R^2	Interpretation
Finger-hand grip strength → Passing	0.891	<0.001	0.794	Very strong, significant
Eye–hand coordination → Passing	0.638	0.002	0.407	Strong, significant

Combined Contribution (Multiple Correlation). Multiple correlation analysis showed that finger-hand grip strength and eye–hand coordination jointly produced a very strong, significant relationship with overhead passing ability ($R = 0.952$, $R^2 = 0.907$, $F(2, 17) = 82.90$, $p < 0.001$), explaining 90.7% of the variance in passing performance, with 9.3% attributable to unmeasured factors such as technical mastery, playing experience, concentration, balance, agility, and motivation (Table 4). Adjusted for the number of predictors and the sample size, R^2 shrinks only modestly, from 0.907 to an adjusted R^2 of 0.896, suggesting the model is not grossly overfit despite the modest sample; nonetheless, replication in a larger, independent sample is needed before this figure can be treated as a stable population estimate.

Table 4. Multiple correlation of finger-hand grip strength and eye–hand coordination with overhead passing ability.

R	R^2	F	df	Sig.
0.952	0.907	82.896	2, 17	<0.001

The regression equation derived from the model was $Y = \square 13.066 + 0.885X1 + 0.446X2$, indicating that each 1-unit increase in grip strength (kg) was associated with a 0.885-unit increase in passing score, and each 1-unit increase in coordination score was associated with a 0.446-unit increase in passing score, holding the other predictor constant. Standardized coefficients ($\beta = 0.759$ for grip strength vs. $\beta = 0.362$ for coordination) indicate that finger-hand grip strength was the more dominant predictor in this sample.

Finger-Hand Grip Strength and Overhead Passing

The very strong association between finger-hand grip strength and passing ability ($r = 0.891$, 79.4% contribution) aligns with, and numerically exceeds, prior reports linking hand/finger strength to overhead-pass quality. Suparman et al. (2021) found that eye–hand coordination, wrist flexibility, and arm explosive power jointly predicted overhead passing among extracurricular participants, while Ishak et al. (2023) showed that push-up and dumbbell training both of which secondarily load the forearm–finger kinetic chain improved overhead passing ability in junior-high extracurricular players. Juhanis et al. (2023) similarly reported that push-up-based strength training enhanced overhead passing skill among adolescent players. The present finding refines this literature by isolating finger-hand grip strength specifically, rather than treating strength as an undifferentiated arm-based construct, and by demonstrating that this narrowly defined

capacity alone explains the majority of variance in a fingertip-executed skill consistent with the biomechanical premise that ball control in the overhead pass is achieved primarily through terminal finger flexion and controlled release rather than proximal upper-limb force (Dong et al., 2024; Winarno et al., 2013).

Eye–Hand Coordination and Overhead Passing

Eye–hand coordination also related strongly and significantly to passing ability (r = 0.638, 40.7% contribution), corroborating Oktaviati et al. (2024), who linked eye–hand coordination and self-confidence to overhead passing performance, and Amalia et al. (2023), who found coordination to be a significant correlate of precision-based hand skills in a different target sport. The persistent technical shortfalls documented by Nam (2025) among specialized volleyball students despite years of formal training suggest that coordination deficits, rather than technique exposure alone, may constrain skill ceilings, reinforcing the practical relevance of the present coordination findings. That the coordination coefficient (r = 0.638) was numerically lower than the grip-strength coefficient (r = 0.891) is also consistent with Herman (2019) and Ertanto et al. (2021), both of which found coordination to be a significant but comparatively smaller contributor relative to strength-based variables in passing- and serving-related criterion tasks.

Combined Contribution and Theoretical Integration

The joint model explained 90.7% of variance in overhead passing ability a markedly higher combined effect than typically reported in comparable multi-predictor studies of volleyball passing (e.g., Herman, 2019; Melly Aulia Muzaemah, 2024), where combined physical predictors have generally explained a smaller proportion of variance in underhand rather than overhead passing criteria. This pattern is theoretically consistent with a two-stage motor-control model of the overhead pass: eye–hand coordination governs the anticipatory and spatial-targeting phase (positioning the hands correctly relative to the incoming ball), while finger-hand grip strength governs the terminal force-application phase (cushioning, controlling, and redirecting the ball). Because both phases are mechanically indispensable and only weakly substitutable for one another, their joint explanatory power exceeds what either construct achieves alone a pattern also implied by Dong et al.'s (2024) finding that the relative contribution of distal versus proximal segments shifts with passing demands, suggesting a dynamic, phase-dependent division of labor between strength and coordination systems. This interpretation extends training-focus research such as Lola et al. (2024), who showed that attentional-focus instructions differentially shape motor-skill acquisition in novice female volleyball players, by indicating that the underlying physical substrate (strength and coordination) may condition how much any given instructional strategy can improve performance. The dominance of finger-hand grip strength over coordination in the standardized coefficients (β = 0.759 vs. 0.362) also aligns with pedagogical observations by Winarno et al. (2013), who catalogued weak finger strength as a leading technical error in overhead passing, and with Apidogo et al. (2021), who emphasized that stable force-production capacities underlie consistent multi-skill execution in volleyball regardless of instructional method. Collectively, these findings suggest that curricula emphasizing coordination drills (e.g., wall-toss and reaction training, as used by Sistiasih & Pradana, 2022) should be paired with, rather than substituted for, dedicated finger- and grip-strengthening protocols to maximize passing-skill development.

Population Novelty and Practical Implications

Unlike the majority of predecessor studies conducted with school athletes (Syafrizal, 2020; Melly Aulia Muzaemah, 2024) or extracurricular club members (Indra, 2026; Ishak et al., 2023; Juhanis et al., 2023), the present sample consisted of undergraduate coaching students who must both execute and later teach the overhead pass. For this population, the practical implication is twofold: instructors should incorporate objective finger-strength and coordination screening into Basic Volleyball Skills curricula, and remedial training (e.g., hand-grip and rubber-ball squeeze exercises paired with wall-toss coordination drills) should be prioritized for students identified as weak on either predictor before advancing to complex passing variations such as passing while diving or jumping (Winarno et al., 2013). Because these students will themselves become coaches, strengthening their own execution proficiency may have downstream benefits for the athletes they eventually train, a transfer pathway not addressed in prior school- or club-based studies.

Limitations and Future Research

Several limitations qualify these findings. First, the correlational, cross-sectional design precludes causal inference; longitudinal or intervention designs (e.g., a randomized grip-strength training trial) are needed to establish causality. Second, the exclusively male, single-institution sample (n = 20) limits generalizability; replication with mixed-sex, multi-institution, and larger samples is warranted, following calls for broader

sampling frames in this literature (Erianti et al., 2023). Third, only two physical predictors were modeled; future studies should incorporate additional candidates such as wrist flexibility, arm explosive power, reaction time, and psychological factors (confidence, concentration) shown to matter elsewhere (Akhmad et al., 2022; Oktaviati et al., 2024). Finally, as testing occurred at a single time point, performance may have been influenced by transient factors such as fatigue or motivation; multi-session testing would improve measurement reliability.

Conclusions

Finger-hand grip strength and eye–hand coordination were each positively and significantly associated with overhead passing ability among undergraduate volleyball-coaching students, and together they accounted for over 90% of the variance in passing performance, with finger-hand grip strength emerging as the more dominant predictor. These findings refine the physical-determinants literature on volleyball passing by isolating a fingertip-specific strength construct, extending the evidence base to a pedagogically distinct population of pre-service coaches, and demonstrating the substantial combined explanatory power of strength and coordination when modeled jointly. Because the design was correlational and cross-sectional, these results should not be read as demonstrating that strength or coordination training causes improved passing; experimental or longitudinal designs are needed before that inference can be drawn. Volleyball instructors and coach-educators may nonetheless consider piloting targeted finger-strength and eye–hand coordination training into technical curricula as a testable strategy to optimize overhead passing competence in future coaching practitioners.

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References

Akhmad, I., Suharjo, S., Hariadi, H., Dewi, R., & Supriadi, A. (2022). The effects of learning strategies on senior high school students' motivation and learning outcomes of overhead passing in volleyball. International Journal of Education in Mathematics, Science and Technology. https://doi.org/10.46328/ijemst.2291

Amalia, B., Prayoga, H., & Fauzi, A. (2023). Hubungan koordinasi mata tangan dan kekuatan otot lengan terhadap ketepatan shooting disiplin 1 (station 1) pada atlet petanque. Jurnal Porkes, 6(2). https://doi.org/10.29408/porkes.v6i2.19286

Apidogo, J., Burdack, J., & Schöllhorn, W. (2021). Repetition without repetition or differential learning of multiple techniques in volleyball? International Journal of Environmental Research and Public Health, 18(19), 10499. https://doi.org/10.3390/ijerph181910499

Batez, M., Petrušič, T., Bogataj, Š., & Trajković, N. (2021). Effects of teaching program based on teaching games for understanding model on volleyball skills and enjoyment in secondary school students. Sustainability, 13(2), 606. https://doi.org/10.3390/su13020606

Dong, M., Lee, J., Wang, J., Xu, Y., Wu, C., & Kim, S. (2024). The contribution of upper or lower extremity of male athletes differs as distances of overhead volleyball pass increase. Journal of Men's Health. https://doi.org/10.22514/jomh.2024.179

Erianti, E., Astuti, Y., & Rosmawati, R. (2023). Implementation of specific physical conditions training models for student volleyball basic technical ability. International Journal of Human Movement and Sports Sciences, 11(6). https://doi.org/10.13189/saj.2023.110616

Ertanto, R., Supriyadi, M., & Syafutra, W. (2021). Hubungan kekuatan otot lengan dan koordinasi mata-tangan dengan kemampuan servis bawah bola voli siswa. Gelanggang Olahraga: Jurnal Pendidikan Jasmani dan Olahraga (JPJO), 5(1). https://doi.org/10.31539/jpjo.v5i1.2850

Fajri, R., Nasution, N., & Sumarsono, R. (2023). Tingkat kemampuan teknik dasar passing atas pada ekstrakulikuler bola voli. Jurnal Porkes, 6(2). https://doi.org/10.29408/porkes.v6i2.23065

Harefa, Y. F., Saragih, F., Arif, S., Ishak, M., & Aulia, R. (2026). Teknik dasar bola voli: Analisis service atas, passing bawah, dan passing atas dalam pembelajaran dan permainan bola voli. Educational Journal, 1(4), 1409–1416.

Herman. (2019). Kontribusi kondisi fisik terhadap kemampuan passing bawah dalam permainan bolavoli pada siswa MAN 2 Kota Makassar. Exercise, 1(1), 313228.

Indra. (2026). Hubungan koordinasi mata tangan dan daya ledak otot lengan dengan kemampuan service atas bolavoli siswa kelas VIII SMP Negeri 4 Muara Bungo [Undergraduate thesis].

Ishak, A., Hakim, H., Sahabuddin, S., Hudain, M., & Bismar, A. (2023). The effect of push-up exercise and dumbbell exercise overhead the passing ability of volleyball games of SMPN 20 Makassar extracurricular participants. COMPETITOR: Jurnal Pendidikan Kepelatihan Olahraga, 15(3). https://doi.org/10.26858/cjpko.v15i3.53824

Juhanis, J., Nur, M., Mappaompo, M., Hudain, M., Azis, A., & Arga, A. (2023). Pengaruh latihan push up normal dan push up tangan di tinggikan terhadap keterampilan passing atas dalam permainan bolavoli siswa ekstrakurikuler bolavoli SMP Negeri 1 Makassar. Jurnal Ilmiah Mandala Education, 9(3). https://doi.org/10.58258/jime.v9i3.5709

Lola, A., Dalamitros, A., Zafeiroudi, A., Eradli, N., Clemente-Suárez, V., & Martín-Rodríguez, A. (2024). The impact of an external compared to an internal focus of attention on simple and complex motor skills acquisition in novice female volleyball players. Children, 11(12), 1560. https://doi.org/10.3390/children11121560

Melly Aulia Muzaemah. (2024). Hubungan kekuatan otot lengan dan koordinasi mata tangan dengan kemampuan passing bawah peserta ekstrakurikuler permainan bola voli putri di SMAN 1 Tanjungsari Gunungkidul tahun ajaran 2023/2024 [Undergraduate thesis].

Nam, N. (2025). Assessment of the current state of overhead passing technique among second-year male students specializing in volleyball at Da Nang University of Physical Education and Sports. International Journal of Physical Education, Sports and Health, 12(3). https://doi.org/10.22271/kheljournal.2025.v12.i3b.3776

Newell, K. M. (1986). Constraints on the development of coordination. In M. G. Wade & H. T. A. Whiting (Eds.), Motor development in children: Aspects of coordination and control (pp. 341–360). Martinus Nijhoff.

Oktaviati, R., Sudrajat, A., & Lengkana, A. (2024). The relationship of intellectual intelligence, hand eye coordination and confidence in overhead passing skills. Juara: Jurnal Olahraga, 9(2). https://doi.org/10.33222/juara.v9i2.3838

Permana, H., Sukamti, E., Suhadi, S., Fauzi, F., & Prabowo, T. (2025). The impact of part-whole passing training on passing accuracy in volleyball athletes aged 10–14 years. Pedagogy of Physical Culture and Sports. https://doi.org/10.15561/26649837.2025.0504

Salsabila, P., Achmad, I., & Gani, R. (2023). Keterampilan bermain bola voli pada peserta seleksi pekan olahraga pelajar daerah. Jurnal Porkes, 6(2). https://doi.org/10.29408/porkes.v6i2.18748

Schmidt, R. A., Lee, T. D., Winstein, C., Wulf, G., & Zelaznik, H. N. (2019). Motor control and learning: A behavioral emphasis (6th ed.). Human Kinetics.

Sistiasih, V., & Pradana, S. (2022). Penerapan metode lempar tangkap bola untuk meningkatkan hasil passing atas bola voli. Jurnal Porkes, 5(2). https://doi.org/10.29408/porkes.v5i2.7079

Suparman, S., Asri, A., & Haeril, H. (2021). Kontribusi koordinasi mata-tangan, kelentukan pergelangan tangan, dan daya ledak otot lengan terhadap kemampuan passing atas permainan bola voli peserta ekstrakurikuler. Gelora: Jurnal Pendidikan Olahraga dan Kesehatan IKIP Mataram, 8(1). https://doi.org/10.33394/gjpok.v8i1.4186

Syafrizal. (2020). Kontribusi kekuatan otot lengan dan koordinasi mata tangan terhadap kemampuan passing atas bola voli pada peserta ekstrakurikuler SMA Negeri 3 Siak Hulu [Undergraduate thesis].

Tobias, A. (2023). Upaya meningkatkan teknik dasar passing bawah bola voli menggunakan model pembelajaran langsung pada siswa kelas VIII A SMP Negeri 1 Kuala Behe. JOSEPHA: Journal of Sport Science and Physical Education, 4(2). https://doi.org/10.38114/josepha.v4i2.378

Widiastuti. (2017). Tes dan pengukuran olahraga. Rajawali Pers.

Winarno, M. E., Tomi, A., & Sugiyanto. (2013). Teknik dasar bermain bola voli. Fakultas Ilmu Keolahragaan, Universitas Negeri Malang.