

Exploring the Benefits and Types of Vertical Jump Training on Volleyball Smash Technique: Literature Review

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ABSTRACT

Study This explore benefits and effectiveness Vertical jump training against Smash technique in volleyball based on review literature. Ability leap optimal vertical is very important for volleyball player for increase height and strength in perform an effective smash. Various method exercise such as Squat Jump, Hurdle Jump, Barrier Jump, Knee Tuck Jump, Leg Press, and Jump Frog has proven increase strength muscle legs, power explosive, balance, and stability moment landed. This literature review show that combination exercise plyometrics and training burden can in a way significant increase performance leap vertical and smash effectiveness. Therefore Therefore, a structured and consistent exercise program is highly recommended. for volleyball athlete for increase their smash technique.

Keywords: Word vertical Jump; Smash; Volleyball; Plyometric; Weight Training

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INTRODUCTION

Volleyball is sport anaerobic intense that combines movement explosive (i.e. , in direction vertical and horizontal) with period short recovery (Silva et al., 2019) . Therefore that, power explosive, which is defined as ability neuro- muscular system individual For realize tension in time as short as Possible (Ramirez-Campillo et al., 2020) , is considered as aspect fundamental from performance successful athletics (Çimenli et al., 2016) . In fact , when speed and agility combined with strength maximum, then the result is strength (Jastrzebski et al., 2014) . Strength muscle allow muscle certain produce amount same work in more time short , or amount more work big in same time , the important thing is For run fast, jump (Young et al., 2016) , and change fast direction (Jastrzebski et al., 2014) . Of course, research has show strong relationship between size power and performance leap vertical (Trajkovi et al., 2016) .

Leap vertical is a movement complex that requires coordination a number of muscles in the trunk body, arms, and legs (Campillo et al., 2021) . Know that every player do more from 250 jumps in volleyball match consisting of five sets (Martinez, 2017) , the ability jump has identified

as one of the factor determinant main performance tall in volleyball (Aghajani et al., 2014) . In fact, several study show that results test jump vertical is indication level performance a athlete (Trajkovi et al., 2016) . For example, Palao, Manzanares, and Valadés (2014) found that performance leap vertical during spiking and blocking more big on volleyball players Canadian national compared with Canadian university volleyball player. In review about jump vertical in volleyball players women and men, take notes that high performing team more Good consists of from player with leap vertical tall (Tsoukos et al., 2018) .

Vertical jump exercise own significant influence to results smash jump in volleyball. *Smash* is technique a very crucial attack in game volleyball, where players utilise strength and height leap For produces a hard and tough ball returned by the opponent (Martinez, 2017) . One of the factor the main determining factor success in do *smash* is tall the jump that can achieved by the player (Ervantoro et al., 2023) . Therefore that, increase ability *vertical jump* become one of the main strategies in increase smash. *Vertical jump training* focus on development strength muscle body part below, especially in the muscles thighs, calves, and hips (Jastrzebski et al., 2014) . With consistent training, athlete can increase strength much needed explosive in jump tall for reach optimal position when do *smash*.

Vertical jump exercises, such as *plyometrics*, *squat jumps*, and *box jumps*, help strengthen muscles involved in the process of jumping. When the leg muscles become more stronger and more reactive, a volleyball player can jump more tall with more power big, so increase the effectiveness of their smash (Ulpı et al., 2022) . Tall player can jump, more and more difficult for against for block the smash. In addition, the practice *vertical jump* also helps repair technique jump player, optimize time off from land, and speed up the process to reach position peak in leap (Çimenlı et al., 2016) . This matter allow player for directing their smash with greater precision and power big.

Not only focus on strength muscle, exercise *vertical jump* also contributes to the aspect agility and stability body player (Trajkovi et al., 2016) . Ability For control body moment jumping, especially when landing, important for prevent injury and make sure player can do leap repeatedly without reduce performance. With increasing strength and stability body part below, volleyball athlete can reduce risk injury and do technique *smash* with more safe and effective (Wahyuni et al., 2021) . Therefore that, the implementation exercise *vertical jump* No only contribute to the improvement height jump, but also support improvement smash result overall.

In general, influence exercise *vertical jump* to results leap volleyball *smash* is very significant. With proper and consistent training, volleyball players can increase strength, technique and power explosion in jump, which in turn will repair quality *smash* they (Ramirez-Campillo et al., 2020; Silva et al., 2019) . A capable player jump more higher and higher strong will own superiority in game volleyball, good in matter attack and persist , so that exercise *vertical jump* become very important component in development ability a player volleyball (Tsoukos et al., 2018) .

Over the decades Lastly, practice vertical jump in volleyball has experience development rapid. Research This usually take approach empirical, such as investigate effect exercise vertical jump during period eight Sunday to performance leap volleyball players, which is played on a surface wood and synthetic (Çimenlı et al., 2016) , evaluate impact exercise vertical jump and training based on volleyball skills in volleyball players woman (Gjinovci et al., 2017) , and assess influence exercise and vertical jump existence to Power explosiveness and power in volleyball players man young (Aghajani et al., 2014) . However, review literature about Topic this is very limited, with only two identified studies (Ramirez-Campillo et al., 2020; Silva et al., 2019) . Second study This limited to data up to 2020, and Silva et al. (2019) recommend more carry on about implementation exercise the For results leap smash volleyball player.

The Gap knowledge This underline need critical For review literature This. The purpose of review systematic This There is two: 1) For evaluate implementation exercise *vertical jump* to results leap *smash* volleyball players; 2) For explain exercise *vertical jump* in volleyball. Overcoming gap This is very important, considering increasing interest For optimize methodology exercise For increase results leap *smash* in volleyball. Review This aiming For bridge gap existing knowledge with give outlook about efficacy from exercise *vertical jump* in volleyball, which ultimately will guide research and practice future training in the field. Questions underlying research review This is: 1) How to benefit from exercise *vertical jump* against volleyball *smash* technique ? 2) What type the most effective *vertical jump* exercise For increase performance volleyball player?

METHODS

Search started with using the Scopus and Web of Science (WoS) databases, both considered as system indexing quote prominent a (Shaffril et al., 2019) , and often visited by researchers previously worldwide (Perdima, Feby et al., 2022) . Search strategy covers combination keyword variations (“ Application ” OR “ Vertical Jump Exercise ” OR “ Jump ” Smash ”) AND (“volleyball ” OR “volleyball player ”) . Starting on the date 17 February 2025, search aiming For identify article in 5 years latest (2020–2025) that meets criteria inclusion. Search done follow Reporting Item Guidelines Choice For Review Systematic Research and Meta- Analysis (PRISMA) (Samsuddin et al., 2020) . In addition, PRISMA emphasizes report review evaluating the trial in a way random , which can functioning as base For report review systematic in various type study (Onofre et al., 2021) .

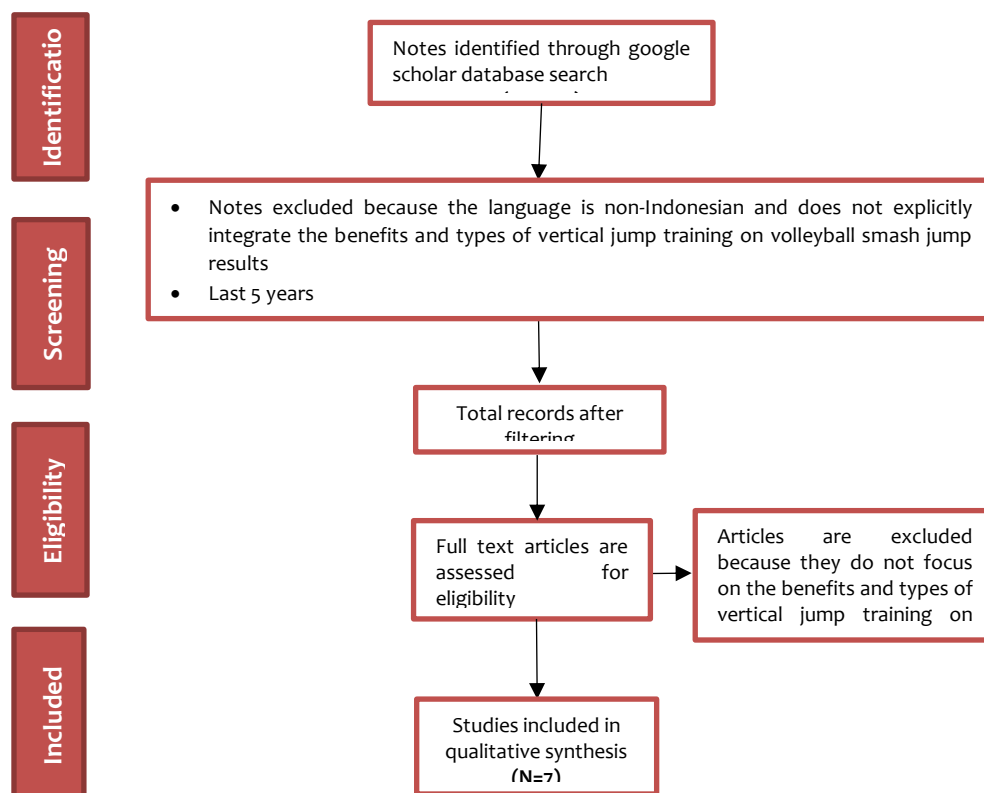


Figure 1. The Flow Diagram of the Study
 (Adapted from Shaffril et al., 2019) .

Criteria Exclusion

Criteria exclusion used is as the following : (1) duplicated articles ; (2) articles that are not published in a journal indexed by the Journal Citation Report (JCR) or Scimago Journal Rank (SJR); (3) articles in Language besides Indonesian ; (4) articles journal with empirical data chosen, meaning article review, series books, books, and chapters in book everything excluded; and (5) articles that do not in a way firm mention technology in volleyball.

Procedure

From the results search 792 publications obtained from the google scholar database. After fulfilling the requirements criteria exclusion, only 7 articles left. The majority article rejected Because lack of focus specifically for training *vertical jump* in volleyball smash jump. All article extracted from the database and analyzed through device Mendeley software for delete article duplicate.

RESULTS AND DISCUSSION

RESULTS

The six categories listed in Table 1 (except author and year) are explained and discussed in 7 article .

Author and Year	Country	Methods	Purpose	Types of Exercises	Benefit	Author and Year
(Sapraji et al., 2024)	Indonesia	Experimental Research	For analyze the effect of skipping and barrier hops training on increase vertical jump in players son at PBV	Skipping Exercise	Increase strength , agility , speed , and performance Volleyball player vertical jump	Bravo's Journal of Physical Education and Health Studies
(Nugroho et al., 2021)	Indonesia	Experimental Research	For know The effect of leg press and squat thrust training on increased leg power	Leg press and squat thrust exercises	Increase leg power muscles in do volleyball smash jump	Journal Window Sport
(Abrian & Nasuka, 2021)	Indonesia	Experimental Research	For know The effect of one leg jump and lateral jump over barrier training on muscle power legs smash ability	Plyometric exercises such as one leg jump and lateral jump over barrier	Increase muscle power legs in smash ability	Unnes Journal of Sport Sciences
(Pajarwati et al., 2024)	Indonesia	Experimental Research	For know implementation innovation jump training against volleyball smash ability	Jumping exercises box	Increase strength muscle but also the criteria more vertical jump big as well as increase performance jump	Journal of Physical and Outdoor Education
(Agustan & Nuryasin, 2024)	Indonesia	Experimental Research	For know The influence of barrier jump and knee tuck jump exercises obstacles) against vertical jump ability in volleyball	jump and knee tuck training	Increase the player 's height , so produce more attacks effective smash, and strong defense	Physical Activity Journal (PAJU)
(Ropianti et al., 2021)	Indonesia	Experimental Research	For know The effect of plymetric squat jump training as an independent variable (X) on leg muscle power (Y)	Squat jump exercise	Increase that Suat jump training provides influence to strength muscle leg	Joset's Journal
(Zubaedi & Muhafid, 2023)	Indonesia	Experimental Research	For know effort increase quality of jumping smash in volleyball game	Hurdle jump training	Increase that Jumping exercise with tool can increase performance in jumping smash	Journal education image sport

Based on Table 1: Findings review library This categorize two question research, namely :

(i) How benefit from exercise vertical jump against volleyball smash technique?

Benefits of vertical training Improve strength, agility / speed, and performance leap vertical volleyball player, training This strengthen leg and core muscles, allowing leap more high and stable, besides that, agility and speed players also improve, helping they move fast and responsive game with Good (Sapraji et al., 2024) . And you can too. Increase leg power muscles important For high and explosive smash jump in volleyball. Exercises such as squats, lunges, and plyometric jumps help increase Power explosion jump, guard stability landing, as well as reduce risk injury (Abrian & Nasuka, 2021; Nugroho et al., 2021) . Increase strength muscle help Power durability and performance leap vertical. Muscle stronger legs and core strong allow leap more high and stable. Exercises such as plyometrics and weights can optimize performance leap in various sport (Pajarwati et al., 2024) . Increasing Player height give profit in smash, attack, and defense. More players tall can do a sharp smash, block more effective, and strengthen defense and range game (Agustan & Nuryasin, 2024) .

Squat Jump exercises play a role important in increase strength muscle legs. Explosive movements in exercise This practice muscle thighs, calves, and hips, so increase Power explosion and stability jump. With exercise routine, player can strengthen legs, increase performance jumps, and reduce risk injury. (Ropianti et al., 2021) . Jumping exercises with tool can increase performance in jumping smash with practice strength and power explosion muscle legs. Use tool like box jumps or resistance bands help increase tall jumps, balance and stability moment landed. With exercise routine, player can do more jumping smashes strong, accurate and effective in match (Zubaedi & Muhafid, 2023) .

(ii) What The most effective type of vertical jump exercise For increase performance volleyball player?

a. Skipping exercises

Skipping exercises have role important in increase vertical jump ability for smash in volleyball. Skipping trains strength muscle legs, power hold on, and foot coordination, which supports leap more high and explosive. In addition, the training This help increase agility and balance, which are important For do a smash with more stable and accurate. With regular skipping exercise, volleyball players can repair technique jump and boost effectiveness attack they (Sapraji et al., 2024) .

b. Leg press and squat thrust exercises

Leg press and **squat thrust** exercises are very effective in increase vertical jump for smash in volleyball. **Leg press** help strengthen muscle thighs, calves, and glutes, which play a role in produce power moment jump. While that, **squat thrust** practice Power explosive , speed, and coordination body, which is important For leap explosive and stability moment do a smash. Combination second exercise This in a way routine can increase tall jump, power muscle legs, and effectiveness attack in volleyball game (Nugroho et al., 2021) .

c. Plyometric exercises such as One Leg Jump and Lateral Jump Over Barrier

Plyometric exercises like **One Leg Jump** and **Lateral Jump Over Barrier** are very effective in improve vertical jump for smash in volleyball. **One Leg Jump** practice strength and balance muscle legs in a way individual, help increase Power explosion moment jump. While that is, **Lateral Jump Over Barrier** increase agility, coordination, and stability body, which is important For movement fast and jump explosive. With routine do exercise this, player can strengthen muscle legs, increase tall jumps, and increase effectiveness of smash in match (Abrian & Nasuka, 2021) .

- d. Jumping exercises frog
Jumping exercises frogs are very effective For increase **vertical jump** in volleyball smash. Explosive movement in exercise This practice strength muscle legs, especially thighs, calves, and hips, which play a role in leap high and stable. In addition, jump frogs also increase Power explosive, balance, and resilience physical, which helps player do a smash with more strong and efficient. With exercise routine, player can increase tall jump and performance attack in match (Pajarwati et al., 2024) .
- e. Jumping exercises barrier jump and knee tuck
Barrier Jump and Knee Tuck Jump exercises are very effective in improve vertical jump for smash in volleyball. Barrier Jump training Power explosion and coordination muscle legs with jump over obstacles, help player reach more jumps high and fast. While That is, Knee Tuck Jump strengthens the core and improves explosiveness leap with lift knee to the chest when jump. Combination second exercise This in a way routine can increase strength, balance, and stability, so that support better smash performance effective in match (Agustan & Nuryasin, 2024)
- f. Squat jump exercise
Squat Jump Exercise very effective in increase **vertical jump** to smash in volleyball. This movement practice strength and power explosion muscle legs, especially thighs, calves, and hips, which play a role important in produce leap high. In addition, Squat **Jump** also helps increase balance and stability moment landed, so that player can do a smash with more strong and accurate. With exercise routine, volleyball player can repair technique jump and boost performance attack they are in the match (Ropianti et al., 2021) .
- g. Hurdle jump training
Hurdle Jump training is very beneficial in improve vertical jump for smash in volleyball. This exercise practice Power explosion muscle legs, especially thighs and calves, so that player can jump more high and explosive. In addition, the Hurdle Jump increases coordination, balance, and speed reaction moment jumping and landing, which is important For do a more smash effective. With exercise routine, player can develop strength jump and performance more optimal attacks in match (Zubaedi & Muhafid, 2023) .

DISCUSSION

Main purpose from this writing is For do review literature systematic in a way deep about role exercise vertical jump against smash in volleyball. From several types and benefits exercise vertical jump that has been reviewed, there is 7 type exercises that can applied that is :

First that is benefit from Skipping exercises have role important in increase vertical jump ability for smash in volleyball. Skipping trains strength muscle legs, power hold on, and foot coordination, which supports leap more high and explosive. In addition, the training This help increase agility and balance, which are important For do a smash with more stable and accurate. With regular skipping exercise, volleyball players can repair technique jump and boost effectiveness attack they.

Second that is benefit from **Leg press** and **squat thrust** exercises are very effective in increase vertical jump for smash in volleyball. **Leg press** help strengthen muscle thighs, calves, and glutes, which play a role in produce power moment jump. While that, **squat thrust** practice Power explosive, speed, and coordination body, which is important For leap explosive and stability moment do a smash. Combination second exercise This in a way routine can increase tall jump, power muscle legs, and effectiveness attack in volleyball game.

Third that is benefit from Plyometric exercises like **One Leg Jump** and **Lateral Jump Over Barrier** are very effective in improve vertical jump for smash in volleyball. **One Leg Jump** practice strength and balance muscle legs in a way individual, help increase Power explosion moment jump. While that is, **Lateral Jump Over Barrier** increase agility, coordination, and stability body, which is important For movement fast and jump explosive. With routine do exercise this, player can strengthen muscle legs, increase tall jumps, and increase effectiveness of smash in match.

Fourth that is benefit from **Jumping** exercises **frogs** are very effective For increase **vertical jump** in volleyball smash. Explosive movement in exercise This practice strength muscle legs, especially thighs, calves, and hips, which play a role in leap high and stable. In addition, jump frogs also increase Power explosive, balance, and resilience physical, which helps player do a smash with more strong and efficient. With exercise routine, player can increase tall jump and performance attack in match.

Fifth that is benefit from Barrier Jump and Knee Tuck Jump Exercises are very effective in improve vertical jump for smash in volleyball. Barrier Jump training Power explosion and coordination muscle legs with jump over obstacles, help player reach more jumps high and fast. While That is, Knee Tuck Jump strengthens the core and improves explosiveness leap with lift knee to the chest when jump. Combination second exercise This in a way routine can increase strength, balance, and stability, so that support better smash performance effective in match.

Sixth that is benefit from **Squat Jump** Exercise very effective in increase **vertical jump** to smash in volleyball. This movement practice strength and power explosion muscle legs, especially thighs, calves, and hips, which play a role important in produce leap high. In addition, **Squat Jump** also helps increase balance and stability moment landed, so that player can do a smash with more strong and accurate. With exercise routine, volleyball player can repair technique jump and boost performance attack they are in the match.

Seventh that is benefit from Hurdle Jump Training is very useful in improve vertical jump for smash in volleyball. This exercise practice Power explosion muscle legs, especially thighs and calves, so that player can jump more high and explosive. In addition, the Hurdle Jump increases coordination, balance, and speed reaction moment jumping and landing, which is important For do a more smash effective. With exercise routine, player can develop strength jump and performance more optimal attacks in match.

CONCLUSION

Conclusion from exploration benefits and exercises **vertical jump** to technique **volleyball smash** based on **literature review** show that improvement strength, power explosion, and coordination muscle legs are very influential to performance jump and smash effectiveness. Various exercise like **Squat Jump, Hurdle Jump, Barrier Jump, Knee Tuck Jump, Leg Press and Jump Frog** proven capable increase tall jump, stability moment landed, and resilience physique player. Plyometric exercises and exercises load also has contribution big in strengthen core and leg muscles, which play a role in produce more smash sharp and strong. Therefore that, the implementation exercise A structured and consistent vertical **jump** is essential in develop more smash techniques effective in volleyball game.

A number of inherent limitations in review This need be noted. First, although search literature comprehensive has done, some published research Possible missed Because possible keywords used different from the keywords used moment This. Second, the database used in search article restricted only on two databases, namely Scopus and WoS. In general overall, research This show that exercise vertical has become an indispensable partner in development of volleyball, and provide valuable contribution for education and science sports. However For optimize benefit technology this, is required study more carry on about efficient and effective

implementation, fulfillment aspect accessibility, and addressing challenges that arise. Researchers next also can adding other databases, such as ScienceDirect, ERIC, IEEE, SPORTDiscus, and others, to in search article. It is also necessary to do implementation exercise vertical to smash increase leap in volleyball sport.

ACCESS TO THE WORKSHOP

With respect and full thank you, i want to to pronounce accept the greatest love to the Supervisor on guidance, knowledge and support that has been given to I. Thanks Mother's direction and advice, I can finish thesis with good. Hopefully all the goodness that has been given get abundant replies. Thank you.

CONFLICT OF INTEREST

I declare that in preparation and implementation article This No there is conflict interests that can influence objectivity and integrity from the results obtained.

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