

Resistance training applied to the demands of volleyball



Section A

Introduction & Definitions

This investigation seeks to consider the range of ways RT can be useful within Volleyball suggested by the coaching literature, we will review how it can be applied as well as what training methods and principles coaches should be made aware of to offer the most effective training to meet the demands of Volleyball. Despite sports, science becoming much more prevalent and RT now being open to a wide cross-section of people due to the popularity of recreational gyms & leisure centers, there is minimal research concerning how resistance training can enhance and optimize that of the Volleyball athletes' performance. Upon exploring several journals & academic literature research has provided solid evidence that RT can assist in the enhancement of an athletes application of power and force, as well contribute to a reduction in injury which will result in an athlete being able to partake more regularly in sessions/competitions and improve.

Approach Taken

Key Words: periodization, resistance training, functional resistance training, power training, periodization

A wide range of electronic databases was searched from 1987 up until today's date using relevant keywords. (Reference lists of all the studies identified around functional resistance training were also searched.

Prominent sources such as; Haff and Triplett, Essentials of Strength Training and Conditioning were utilized as well, for the investigation it was necessary

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to systematically search multiple electronic databases & multiple strength and conditioning journals (e. g., PubMed/NSCA) but there was a significantly small amount of data which was up to date regarding RT specifically for Volleyball. Instead, the investigation focused on the principals of RT & different methods which have been supported by peer viewed Journals which have resulted in success in other sports such as American Football, Ice Hockey, etc. By understanding how programs are individualized based upon needs or requirements the investigation aims to give coaches an understanding of how to apply these methods correctly.

Trustworthiness of Sources

Due to the lack of information regarding RT specifically for Volleyball, there are some dated sources (1973) so its quality in terms of relevant information can be questioned. However, using relevant and up-to-date sources the investigation has tried to support the information supplied by the authors. Google Scholar & the Open University Academic material were utilized for the majority of this report, we can assume they are reliable and up to date.

Section B

Main Findings from the literature

Strength Demands in Volleyball

Team Volleyball is a dynamic sport made up of muscular endurance and explosive movements. (C. Dupuis 2003). In a strength and conditioning journal written by the University of sports science of France the techniques of the game force the shoulder muscles to work under heavy constraints. <https://assignbuster.com/resistance-training-applied-to-the-demands-of-volleyball/>

The same could be said for the continuous jumps, rapid changes in direction and spiking the ball. In an article by Rick Butler and Kay Rogness (2003), they bring to our attention the presumption that Volleyball is a recreational sport where injuries are unheard of. It is suggested that not only will a proper strength & conditioning program improve overall performance but reduce injuries due to wear and tear of repeated spiking and diving. What this report aims to investigate is not only will strength & conditioning programs help athletes maintain high levels of application throughout the match, but also how they can reduce injuries for that of the advanced to intermediate athlete. (R, Butler & K, Rogness 2003)

Functional Resistance Training in Volleyball

Butler (2003) recommends that training should be specific for the sport. Exercises that are appropriate for that of a wrestler are not necessarily appropriate for a Volleyball player. A lot of journals using google scholar had a considerable amount of information is centered around program design and its' effectiveness. Professional coaches in the sport have noted the improvement of these abilities is a crucial priority for a volleyball. Several studies have reported significant improvements in vertical jump following resistance training (Baker et al, 1994) and (Stone et al, 1981) when mimicking motions such as doing the squat.

The authors below proclaim the purpose of strength training for volleyball is not to build big muscles, but to develop the physical characteristics necessary to improve a player's performance. Rogness (1983) stresses this point by stating training with resistance should be done through a full range

of motion of each movement for the volleyball athlete, and that it is crucial to preserve and enhance flexibility and mobility as well and not disregard this for sheer strength.

McBride (1999) emphasizes this by stating insight into how bodily movements are carried out will give professionals a platform to facilitate the design of safe and effective programs. Gretchen D. Oliver (2009) underpins the above statement by McBride (1999) by mentioning that not only is functional training cost effective but it should be considered for any strength & conditioning program to enhance program specificity, effectiveness and to develop functional postural activation. “

Instability resistance training coaches have claimed that the greater instability of the unstable platform and human body interface will stress the body to a greater extent than traditional resistance training methods using more stable benches and floor. Stress, according to Selye (1973), is essential in forcing the body to adapt to new stimuli. This could be useful in preventing injuries when landing unevenly on one leg after spiking a ball and distributing force unevenly.

However, It is worth drawing attention to most sports involve dynamic balance Volleyball is no different, instability resistance training is typically performed under fairly stationary conditions. Whether possible improvements in static balance or stability will transfer effectively to dynamic stability is still debatable, however. (Willardson 2004)

In a study done by the National Strength & Conditioning Association of British Columbia using static instability devices such as Swiss balls, domes, wobble
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boards they found the training dynamics do not specifically always match the athletic performance. Reinforcing the doubt whether or not instability training would enhance sports performance. Willardson (2004) states that “the optimal method to promote increases in balance, proprioception and core stability for any given sport is to practice the skill itself on the same surface on which the skill is performed in the competition.” Unfortunately, this is not always possible, for example, for some outdoor sports (i. e., football, baseball) during the winter season in northern climates or sports that utilize ice surfaces when the arenas are closed in the warmer seasons.

Mel C. Siff (2002) warns against possible fads, cults and organizations in the strength and conditioning world and how some coaches have only appeared to have discovered some ‘ unique’ form of training. Due to its a boost in popularity, its proponents are creating the impression that all other approaches to sports training are wrong, unproductive or ineffective.

While investigating the most effective way to apply RT to Volleyball athletes, there were several debates surrounding that the use of methods that move limbs in 1-2 planes will not improve performance and may even sabotage pre-existing patterns of efficiency. Mel. C Siff (2002) argues that the idea of sit-ups, squats, dips, bench press & deadlifts were of no benefit at all or detrimental to athletes is complete nonsense. Studies from the literature have shown that even the most basic forms of RT have shown improvements in overall health including; increased bone, muscle, tendon & ligament strength alongside improved cardiac function and a reduction in risk of injury.

According to Mel C. Siff (2002), functional training value lies in knowing why, when, how, and how much it should be used in the training process and not in its sole use to the exclusion of all other methods. He further goes on to emphasize that a point that coaches raise is the most specific and functional form of training is the sport itself if functional training was the most effective form of training this would lead to all supplementary training being of little worth. Resulting in a domino effect on the entire profession & science of strength coaching as it exists entirely for the basic strength training can play an effective and safe role in the enhancement of an athlete within a given sport.

Training Methods & Approaches

Over the last few years, resistance training has bolstered its popularity, particularly for its ability in improving athletic performance by improving muscular strength, endurance, power & speed as well as balance and coordination when the correct programs are applied. (Kraemer & Ratamess, 2004) In the genesis of it's debut in the fitness world resistance training was performed by few athletes, however with the progression of science and the health-related benefits understood now by resistance training it has become a popular form of exercise from the serious athlete to that of an elderly person looking to improve mobility so much so that is recommended by national health organizations such as the American college of sport & medicine.

What we can gather from these studies is the key factor in successful resistance

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training at any level of fitness or age is appropriate to program design. What this statement entails is that you would not recommend a bodybuilding program to that of an elderly male in his 80's, or in this case, to that of a volleyball player.

An approach when designing resistance programs taken from the literature is that RT programs require adequate instruction (e. g., fitness tests to locate strengths & weaknesses, rest periods, injury rehabilitation, correct use of equipment), goal setting (so the program can target specific areas of interest) which is not only important when achieving the desired results but for keeping athletes interested as to how they contribute to the sport according to Martens (2004). It is important that resistance training should be supervised by qualified professionals for the prevention of injury and for maximizing the health and performance benefits. (Mazetti 2000).

Fleck (2004) introduces the principle of individualization when it comes to effective training approaches. He points out that resistance training itself does not ensure optimal gain in muscle strength & performance. Instead, by understanding the goals and requirements of the athlete or individual the correct training regimes can be applied, dependent on the individuals own efforts the outcome will be determined.

In the academic material, Gregory (2015) emphasizes how choosing an appropriate training method (repetitions and sets, the velocity of movement, periodization, etc) can make a considerable difference in the outcome of a resistance-training program. An example being high volume programs have a greater influence on body composition and endurance factors than doing

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low volume programs. Free weight application of resistance by a freely moving body such as bench press, squatting, medicine balls allows for accommodation of resistance and force production. Stone suggests that there are 3 basic training principles: overload, variation, and specificity.

Resistance Training Principles

Progressive Overload

When looking at the academic material a basic definition for overload is concerned with providing a proper stimulus for eliciting a desired physical adaption. Kraemer (2004) reinforces this statement by suggesting the human body will only adapt and respond if it is consistently required to exert greater force to meet the demands of the given activity.

In correlation to the above statement, Baker (2001) stresses the importance of an athletes ability to produce force quickly. In Volleyball we could apply this to an explosive technique such as the Spike. In a literature piece centered around Strength & Conditioning by Kawamori (2005) he suggests that Power can be defined as a product of force and velocity. Newton (1996) highlights that peak power is the greatest power generated throughout a given movement and is formed only when force & velocity are at peak values. Due to this, power development and how it be integrated into training programs for application in Sport for optimal results are of deep interest to coaches and sports scientists.

A recommended practice for which overloading can be introduced for strength & power, hypertrophy and/or muscular endurance according to a journal by William Kraemer (2005) is;

1) Load resistance may be increased.

For jumping progression, Baker et al (1994) noted ideal optimal loads are gained at 50-60% of 1RM when performing exercises such as the bench press, throw, and squat jump.

2) Reps may be added to the current load

In an article written by the Volleyball research department in Spain, an experiment concluded that even low-frequency strength and endurance training lead to changes in explosive strength development. Hakkinen (2003) further suggests that when the volume of training or reps is higher this can still have an effect on overall strength development.

3) Repetition speed can be altered

Studies have concluded that programs which utilize the different speed of movement provide increases in strength according to Gonzalez (1995). Examples from the literature include a squat jump, which consists of the athlete lowering themselves slowly and in a controlled state into a crouch position and then exploding up mimicking that of a defender returning a serve in Volleyball.

4) Rest periods may be shortened for muscular endurance

5) Volume may be increased within reasonable limits

This approach is also featured in the academic text, and how to overload, when applied correctly, can avoid overtraining and the desired physical adaptation will occur. (Gregory, 2015)

Variation

Another principle to emerge from the Academic text is variation. According to studies done by Seyle (1976), the body adapts via 3 phases when confronted by stress, these being;

- Shock

Otherwise known as DOMS (Delayed Onset Muscle Soreness) showing a response to the original training stimulus.

- Adaptation

Performance increases during adaptation, as the body is learning to cope and deal with the stress it is being routinely put under more efficiently.

- Staleness

Hakkinen (1987) describes this is when a 'plateau occurs', one of the more popular examples of variation to combat this which emerges throughout the literature is the use of periodization, this is a systematic variation of exercise which alters program design to optimize both performance and recovery.

Specificity

When looking at Specificity, Delorme (1945) from the academic material suggests exercise and training is the most important consideration when selecting appropriate equipment for resistance training, especially if performance enhancement is a primary goal. When an athlete is training in a specific manner to produce a specific adaptation or training outcome specificity refers to aspects of muscles involved. One of the examples used in the literature is that things like a squat movement are relevant to vertical jump because it involves overcoming resistance in the same movement and the same muscles are being used. (Gregory, 2015)

It's important when approaching this type of training that the coach explains to the athlete as to why they are doing it, especially when basing programs around functional training. Authors Christina and Corcos suggest that you can increase your athletes' motivation to learn skills by not only explaining its value but also pointing out well-known or successful athletes which partake in this type of training. (Christina and Corcos 1988, p. 33)

Machines Versus Free Weights Resistance Training

When investigating what is the most effective form of resistance training we need to look at all available resources available to us. Below are some studies which highlight which training approach an athlete can take which will provide them with the most effective training regime.

Short term studies using specific strength tests have indicated that free weights produce superior strength gains. These studies indicate when measuring 1RMs, free weight training transfers to machine testing better than machine training transfers to free weight testing. A major advantage of <https://assignbuster.com/resistance-training-applied-to-the-demands-of-volleyball/>

free weights is movement can take place in all 3 planes and is not guided or otherwise restricted by a machine. It should be noted that machines can limit movement or exercise selection in several ways. (Stone et al., 1991)

Studies from the literature have found that free resistance weight training benefits over machines for the following reasons:

1. Machines allow little mechanical exercise variation, whereas free weights allow unlimited variation.
2. Most machines typically permit movement to occur in a single plane; free weights require balance and therefore permit exercise in multiple planes.

Periodization Programs for Resistance Training

According to L. Brown (2005) periodization became a catchphrase in the 1960s to promote an exercise system that, if designed correctly, would help prevent overtraining while optimizing peak performance through progressive training cycles. Plisk (2003) defines periodization in laments terms as a planned distribution of specific variations introduced into training method programs at regular time intervals.

Periodization being able to fluctuate workload increments can offer potential growth in performance and reduce the risk of overtraining says Stone (1999). So much so that due to its specific sequencing of exercise selection and volume as well as intensity factors it can offer a superior method of performance enhancement in Volleyball.

Section C

Practical Applications & Recommendations

Main Recommendations for Resistance Training Applied to a Specific Sport (Volleyball)

This investigation has reviewed several pieces of journals, articles & academic material surrounding RT applied to Volleyball. Advice surrounding specifically Volleyball is unfortunately quite dated but when comparing it side by side with the academic literature we can assume this information is still reliable. By looking at different training approaches and advice from several experienced coaches and knowledgeable authors we can gain a firm understanding of what sort of resistance training we can recommend to the sport of volleyball.

Recommendation 1

Coaches/Instructors need to understand the pre-requisites of a sport before applying just another program for RT to be truly effective. As opposed to getting carried away with their own ideas or sticking to traditional programs. They should be wary of 'fads' and try to individualize programs to be truly effective in their instruction.

Recommendation 2

Coaches/Instructors need to use programs effectively, periodization is something that has emerged constantly throughout the literature. This can work as an important guideline in different stages of the Volleyball athlete,

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whether it be in-season or off-season, it can ensure they are reaching optimal levels of performance and avoiding overtraining within that time frame.

Recommendation 3

Coaches/Instructors need to be aware of the 3 principles (Overload, Specificity, Variation) when it comes to training approaches which have constantly emerged not only in Journal Articles but in Academic Literature in order for the athlete to progress through the application of RT. While investigating we briefly explored what sort of RT could be more effective for sport. Given the support from several articles, free weights have shown the ability to allow more freedom of movement. However, that does not mean we must disregard machines.

In conclusion of this investigation, coaches/instructors need to heed the needs & goals of the athlete before the application of RT. RT program design can start off simple and then progress from there based on the individual, by taking fitness tests regularly and watching an athletes' progression studies have shown that once a solid foundation has been formed specific RT training with greater variation has shown enhancement in an athletes ability to perform and apply force. Periodization is one of the several ways coaches can utilize and manipulate program design and has emerged throughout the literature as seemingly the most popular. For Volleyball which is a sport which consists of multiple training sessions & matches on-season and offseason, the aim is to preserve muscular power, maximal strength & performance levels by following an RT program specifically catered to

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Volleyball. As long as coaches/instructors adhere to the 3 principals of training; overload, specificity, and variation using the evidence & recommendations provided are likely RT training will be of benefit to a Volleyball athlete.

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