

# THE RUGBY FOOTBALL UNION

## Strength Training for Young Rugby Players – Position Statement

### Introduction

1. This paper provides the RFU position statement on strength (also referred to as “resistance”) training for young players. It outlines the risks of strength training activities via a literature review, attempts to define the various descriptions that are frequently mis-used with reference to strength training and seeks to address some commonly expressed concerns. It was discussed at the Playing Development Sub-Committee on 4<sup>th</sup> January; Club England on 14<sup>th</sup> February; Schools & Youth Governance Sub-Committee on 27<sup>th</sup> March and Governance Committee on 13 April 2007, when it was adopted formally.

### Executive Summary

2. Young people are not naturally physically prepared via their normal, everyday lives for the rigour of rugby; strength training may decrease the risk of sports related injuries. In order to be physically prepared to play professional rugby at c.21 (this expectation is getting younger) a player should have started a strength programme in his early teens.
3. Statements from the National Strength and Conditioning Association, the American Orthopaedic Society for Sports Medicine and the American Academy of Paediatrics all indicate major benefits of strength training for children.
4. Strength training may enhance bone development in younger children (Mackelvie et al British Journal of Sports Medicine 36 2002).
5. There is no evidence to suggest that the risk of injury associated with strength training in youth is greater than that associated with other recreational activities in which children and teenagers participate regularly (Jones et al Phys Sports Med 28 2000).
6. The most common causes of injury...are due to lack of supervision (Jones et al Phys Sports Med 28 2000). The RFU elite rugby department has developed strength and conditioning coaching qualifications for sport at levels 1 and 2 and 3 in order to train a suitably qualified workforce – professional and voluntary.
7. The period of greatest trainability in strength is 12 to 18 months after the adolescent growth spurt (average 14.1 years in boys). This may vary between individuals by as much as six years, so chronological age is only minimally helpful in defining policy.
8. Planned strength training programmes should be introduced in the early secondary school years. If this is not done via schools, sports governing bodies and their constituent clubs must lead in this area.
9. The physical status of young rugby players who aspire to play at the elite level should be monitored throughout their careers. In order to do this the RFU elite rugby department has developed the fitness and anthropometric scoring template (*FAST*) system. This system monitors and provides feedback on a wide range of fitness and anthropometric variables specific to adolescents.

## What's the Problem?

10. Professional rugby players are increasingly large and powerful. England international forwards and backs in 2003 weighed, on average, 109 kg and 90 kg respectively, compared with 100 kg and 83 kg for their counterparts in 1991. A greater proportion of this additional weight in modern players is lean body mass, so more force is generated in the collisions. (England Rugby Injury and Training Audit 2002-04).
11. In order to compete in the professional game a young player must often become bigger, nearly always stronger and definitely more resistant to injury through the use of a strength training programme. Most players in England will not have been introduced to this type of training until 16 - in many cases 18 - years old. The player is then often "fast tracked" through a strength programme in order to prepare him for the rigours of the adult game. This is potentially injurious to the player if the necessary foundation work has not been done to enable him to tolerate the loads:

*And young athletes are making the same mistake so many did in the 1950s and 60s. They attempt to "play themselves into shape". With high sport demands and forces acting on young bones, ligaments and tendons, sport related injuries have started to proliferate. Often injury is due to being physically unprepared to participate. Optimal resistance (strength) training may in fact be key to the prevention of injuries in high school athletes.*

*By the early 90s people realized young athletes needed to prepare their bodies as they were not able to meet the demands and resistance (strength) training may be of help in preparation and injury prevention*

(Michelis et al 1986 Paediatric and adolescent sports injury: Exercise and Sports Science Review, and Metcalf & Roberts 1993 Strength training and the immature athlete: An overview Paediatric Nursing 19 (4), quoted in Strength Training for Young Athletes p3 Fleck and Kraemer)

*The length of the "foundation training" depends on the age of the athlete, his general training background, and on the volume and intensity of his workouts. It usually lasts 3 to 4 years. "Build up training" usually starts at the age of 13 or 14 and takes about 4 to 6 years. Should not be completed before 17 and not after 22*

(The Pedagogic Principles of Track and Field Training" - Principle of Gradualness and Principle of Age-Dependence Gerhardt Schmolinsky P 104.)

*An athlete should use strength-specific exercises and exercises with a barbell, such as barbell squats, only after three years of preliminary general preparation*

(Science and Practice of Strength Training Vladimir Zatsiorsky p138)

12. This means that in order to be physically prepared to play professional rugby at c.21 a player should normally have started a strength programme in his early teens. Current misconceptions and ill-founded fears about strength training for young people mean that such training will not happen spontaneously; if anything it will be actively discouraged. A position statement from the RFU, allied with a variety of technical developments will help create a positive and safe approach to strength training for young players.

## What is Strength Training?

13. Terminology around the topic of strength training can be confusing and misleading. The following are some common terms, along with a brief definition / explanation for each:
  - **Power lifting** – a competitive sport comprising one repetition maximum (1RM) lifts in bench-press, dead lift and back-squat for athletes in different weight categories. Paradoxically, the event is actually a measure of maximal strength rather than power, since the movements are typically relatively slow.

- **Olympic lifting** – a competitive sport comprising one repetition maximum lifts in the snatch and the clean & jerk for athletes in different weight categories. These are actually a measure of power, since the movements are of necessity very fast.
- **Weight lifting** – a competitive sport comprising one repetition maximum lifts in a variety of different lifts for athletes in different weight categories, generally involving lifting and holding a loaded bar overhead.
- **Bodybuilding** – training that generally isolates individual muscle groups with the purpose of making them bigger and more prominent. In competitive body building, judgements are made solely on appearance.
- **Weight training** – using weights (free or machine) for the purpose of improving muscular strength and/or size.
- **Strength training** – any form of conditioning designed to improve the trainer's ability to exert or resist force, e.g. weight training, push ups and other body weight exercises.
- **Resistance training** – as for strength training.

### Player Development

14. Children should have multilateral and multi-skilled preparation. This approach teaches the fundamental skills of gymnastics and track and field as these contain the basic movements common to all sports. Too many coaches follow very short term goals, focusing on winning the next game or event. A much longer and more systematic approach is required to produce more elite level athletes but also a greater base of athletes nearing their genetic potential.
15. Early specialisation in rugby may produce junior champions, but these players may not excel or, more importantly, may be prone to injury at adult level due to inadequate physical training in their early years. Research has concluded that it takes eight to twelve years (10,000 hours) of deliberate practice for a talented athlete to reach elite level. There are only a few countries where basic athletic preparation for children is characterised by overall preparation. Their athletes typically demonstrate superior physical and physiological attributes. The physical education system in the UK does not allow for this to happen. Therefore it is imperative for sports governing bodies to take on this role via their constituent bodies and clubs:

*Young bodies are not prepared for the rigour of sport and resistance (strength) training may decrease the risk of sports related injuries*

(Smith et al 1993 Medical Science Sports & Exercise 25)

16. One of the most important periods of motor development for children is between the ages of nine and 12 when they are able to acquire the fundamental movement skills that are the cornerstones of all athletic development the monitoring of body alignments to correct muscle imbalances and maintain optimal flexibility ranges.
17. Strength development via the use of medicine balls, Swiss balls, body-weight exercises, climbing ropes, wall bars, trees and frames are all methods that can be used. These are fun and do not contribute to overtraining or overuse injuries if done correctly. The volume must be kept small and the programmes well monitored. Multi-joint exercises can be learned using dowels and dumb bells at the end of this stage.

*During the early stages of puberty, bone may be particularly responsive to weight bearing, high-impact exercise suggesting that resistance (strength) training may enhance bone development in younger children during that time*

(Mackelvie et al British Journal of Sports Medicine 36 2002).

*Bone mineral content of junior Olympic weight lifters was greater than those who do not lift*

(Convoy et al *Medicine & Science in Sport & Exercise* 25 1993, Virvidakis et al *International Journal of Sports Medicine* 11 1990).

*Bone density peak in boys is between 13 & 15 years & therefore resistance (strength) training may be important during these times.*

(Strength training for Young Athletes Fleck & Kraemer p 24)

18. In the early years of secondary school there should be the introduction of a planned strength training programme. Strength training should begin with circuits. Initially the volume of training is small. The emphasis is on learning the correct lifting technique and gradually building work capacity. The programme will strengthen ligament structure, develop core strength and stability, and incorporate balanced shoulder development, knee and ankle strength.
19. The period of greatest trainability in strength is 12 to 18 months after the adolescent growth spurt (average 14.1 years for boys). Some early maturing players should be introduced to hypertrophy (muscle development) training and modified maximal strength towards the end of compulsory schooling. In order that children can be treated according to their biological as well as chronological age, estimates of maturity and final stature are built into the new *FAST* scoring template. The *FAST* system is currently available to all academies. With this system a player's fitness profile can be assessed against international standards throughout his career and the added value of physical training can be measured and compared with gains made solely due to growth and maturation. Age-specific conditioning programmes will be part of the curriculum of the new schools of rugby which start in autumn 2007. The RFU should provide guidance and programmes via its website and other publications that can be delivered throughout the game.
20. In the final two years of school, strength training should take place four times per week during the general preparation phase, three to four times per week during the specific preparation phase and 2 - 3 times per week during the competitive phase. A large percentage of training is anatomical adaptation and hypertrophy in the initial years. Training for maximal strength will become dominant with conversion to power in the pre-competition stage. Strength training should start to match the needs of the individual player during this stage, and become position specific. A comprehensive strength and conditioning curriculum already exists for this age group in the rugby academies.
21. It is important that young players are supervised by a competent coach. In order to increase the number of competent coaches the RFU has led the way in developing certificates in coaching strength & conditioning at levels 1, 2 and 3 for all sports. RFU conditioning coaches have also been active in recruiting and training over twenty tutors to deliver these courses. These awards are fully recognised by the Learning Skills Council and sit on the framework of the Qualifications Curriculum Authority.

### **Children and Weight Training: Breaking the Myths**

22. Contrary to the traditional belief that strength training and plyometric training are dangerous for children, it is now suggested that such training can be a safe and effective activity. (UK Athletics 03/02).
23. Specific guidelines for children and weight training were established at a workshop in 1985 representing eight organisations; the American Orthopaedic Society for Sports Medicine, the American Academy of Paediatrics, the American College of Sports Medicine, the National Athletic Trainers' Association, the National Strength and Conditioning Association, the President's Council on Physical Fitness and Sports, the US Olympic Committee and the Society of Paediatric Orthopaedics (quoted in *Physiology of Sport & Exercise* Costill p528).

24. The American Academy of Paediatrics, Committee on Sports Medicine and Fitness Policy Statement "Strength Training by Children and Adolescents" states that:

*Strength training programs for preadolescents and adolescents can be safe and effective if proper techniques and safety precautions are followed.*

25. In addition, resistance training has potentially beneficial effects on motor and sports performances, bone mineral content, body composition, and in reducing sport injuries (Malina 2006).
26. Statements from the National Strength and Conditioning Association, the American Orthopaedic Society for Sports Medicine and the American Academy of Paediatrics all indicate major benefits of resistance training in children:
- Increased muscular strength
  - Increased muscular power
  - Increased local muscular endurance
  - Decreased injury risk in sports and recreational activities
  - Improved performance in sport and recreational activities

### **Injury Rates**

27. According to Faigenbaum (Strength & Conditioning Feb 2003) in the Round Table on Youth Resistance Training there is:

*No evidence to suggest that the risk of injury associated with resistance (strength) training in youth is greater than that associated with other recreational activities in which children and teenagers participate regularly.....*

28. The most common causes of injury...are due to lack of supervision (Jones et al Phys Sports Med 28 2000).
29. Of 22 reports only 10 studies systematically monitored injuries and only three injuries were reported. Estimated injury rates were 0.176, 0.053, and 0.055 per 100 participant-hours in the respective programs (Weight Training in Youth – Growth, Maturation, and Safety: An Evidence-Based Review Robert M. Malina, PhD Clinical Journal of Sport Medicine 2006; 16:478–487).
30. In a previous study reported injury rates per 100 participant-hours were:
- resistance (strength) training for conditioning 0.0035
  - weight lifting for sport 0.0017
  - soccer 6.20
  - basketball 0.3
  - football 0.1

(Relative safety of weight lifting and weight training B. Hamill Journal of Strength and Conditioning 1994).

### **Conclusion**

31. Young rugby players need a long term, comprehensive skills and conditioning programme that includes well planned and supervised strength training from an early age. This is desirable for all young players who might eventually play club rugby as adults; it is essential for young players who aspire (realistically) to play at the elite level.

## **Rugby Football Union Position Statement**

### **Strength Training for Young Players**

#### **Benefits**

Peer-reviewed research indicates that strength training may be beneficial to young rugby players through:

- the prevention of injuries
- improved body composition
- improved sports performance due to increased strength, power and muscular endurance

#### **Child Welfare**

All children can participate safely in strength and conditioning programmes provided they:

- have no obvious medical contra-indications
- can demonstrate the ability to accept and respond to instruction
- are supervised by suitably qualified personnel (e.g. BWLA Instructor, UKSCA accredited, minimum Level 2 Certificate in Coaching Strength & Conditioning) who have also received training in coaching or teaching children and have read the RFU's policy and procedures for the welfare of young people in rugby union. This is an absolute requirement for children under 16 years of age
- are supervised in facilities with adequate lighting, ventilation and space and with adequate accident and emergency procedures
- use equipment that is appropriate for their age, size and experience, and checked regularly for any sign of wear
- are given general warm-ups, cool-downs, and rest and hydration breaks

#### **Equipment, Exercises and Volumes**

- strength training for children under seven years old could include body weight exercises (e.g. rope-climbing, push-ups, sit-ups etc), partner exercises (e.g. pushing and pulling games, relays involving carrying and throwing light medicine balls). They may be introduced to exercises using a limited range of safe equipment such as exercise balls and light medicine balls. As a general guide, such activities should take place twice a week for 10 – 15 minutes, be fun and integrated with a well-organised play session
- children under seven years old should never train in facilities designed for adults nor use weights machines or free weights
- children from seven to 10 years old may be introduced to simple exercises with child-sized barbells (or barbell substitutes such as broom handles or dowels) and dumb bells such as lunges and step-ups. They must be taught - and demonstrate that they have learned - the correct technique in all the exercises in the programme. No resistance should be applied until they can demonstrate correct form without additional weight. There must be a gradual, progressive and manageable increase in training volume. At this age, up to three sessions a week of around 15 minutes would be beneficial
- children from 11 years old upwards until 12 months after the adolescent growth spurt has started to slow down (on average around 15 years old in boys) may add more complex exercise movements to their practice (e.g. squat, clean, snatch). Up until 12 months after the adolescent growth spurt has started to slow down children should lift a weight that allows a minimum of six repetitions in good form. At this age, up to three sessions a week of around 30 minutes would be beneficial
- Twelve months after the adolescent growth spurt has started to slow down, players may be introduced to more advanced programmes using a progressive increase in volume and intensity (resistance / weight applied). For young players of this age who genuinely aspire to play elite level rugby, an introduction to such training programmes is essential, under the guidance and supervision of a qualified coach.