

4 TECHNIQUE

Good technique in sport involves a well timed and co-ordinated sequence of muscle actions. Through the experience of players, coaches and the analysis provided by sport science, “best practice” techniques have been developed for many of the skills in sports. These techniques have evolved and been refined so that the movements involved produce the best performance and are least likely to cause injury.

In sport it is often the best coaches who get to coach the better or most experienced players. New coaches or well meaning but technically unskilled coaches often coach new players in sport. This means players are at risk of injury from being taught incorrect technique. Coach education is an important factor in reducing this problem.

The Aims and Benefits of Good Technique

Using good technique in sport is beneficial because it promotes high performance and reduces the risk of injury. Players need to develop the skills necessary to perform the movements of their sport correctly.^[1] If players learn and use incorrect techniques they may at first perform well but they are placing themselves at increased risk of both acute and chronic injury that will reduce their ability to perform. Players should be responsible for learning correct techniques, practising them and using them in competition. Coaches should make teaching correct technique a priority and should frequently observe their players’ performance to ensure those techniques are being used. The role of the coach is very important as the skills passed on to players at an early age can be carried through an entire career. Consequently, coaches must stay up to date with the latest techniques and teaching methods. In this way the players benefit from the use of correct technique, which will optimise performance and minimise the risk of injury.

All sports contain activities that have an element of injury risk. For example, in rugby league and rugby union the tackles and scrums are potentially dangerous; in netball it is the sudden changes of direction, the “stepping” rule and repeated landings; in soccer it is the twists and the tackles; and in cricket it is the bowler’s delivery actions. Coaches should identify risky activities in their sports and ensure

correct techniques are used. For example, a Fosbury high jumper whose take-off foot is planted in an externally rotated position is placing excessive stresses on the ankle joint. The jumper must be coached to take off straight (their flight rotation will occur without twist off the ground if their forward speed and sideways lean are sufficient).

Coaches should also provide advice on the correct use of equipment. An example is the correct grip on an implement (e.g. racquet sports, hockey, netball, cricket, rowing) to reduce the risk of injuries such as tendonitis.

Best Practice for the Good Technique Process

Best practice for a variety of general movements is outlined in the following sections. Guidelines on specific sports techniques such as rugby scrummaging and netball landing are available in resources such as the *Principles of Rugby Coaching Manual*,^[2] Netball New Zealand’s *Level One Coaches’ Handbook*^[3] and *Netball – Your Body: Your Choice!*,^[4] available from the relevant national sports organisations.

Observing players’ performance when assessing technique is greatly assisted by the use of video. This may be replayed with the coach focusing on different aspects of the performance in each replay. Video cameras and video analysis systems are available at the New Zealand Academy of Sport (NZAS) regional centres for use by coaches in coaching athletes. Good technique involves co-ordinated muscle actions (smooth or non-jerky movements) and a correct sequence of actions (large muscle groups before small muscle groups). For best performance, basic principles of physics must be applied. For example, apply forces in the desired direction of motion, or apply forces over a large period of time to generate a large change in motion. Players’ posture, forces and range of motion should be considered, particularly in sports with frequent overuse injuries (e.g. cricket pace bowling, rowing, hockey, equestrian riding). Books on sports biomechanics, available through NZAS regional centres, can provide further information on technique analysis in sport.^[5,6]

CO-ORDINATION

Performing skills with correct technique requires a high level of co-ordination. Co-ordination training needs to be incorporated into players' early development. Players may be taught difficult skills more easily if they have developed reasonable levels of general co-ordination from learning simple skills. When teaching technique, it is important to first teach the basics and refine the minor technical aspects later. Correct technique needs to be taught and reinforced early as it can be very difficult to "unlearn" incorrect techniques.

JUMPING AND LANDING

Many sports injuries are associated with jumping and landing. Each time the foot lands on the ground from a jump, forces as high as six times body weight^[7] are transmitted into the body. The best way to absorb and distribute these forces is to bend and flex at the hips, knees and ankles, as this spreads the force over time, transfers the impact force to the muscles and avoids jarring in the bones and joints. Using this method and ensuring that players are landing with the leg in alignment (knees over toes) are simple and effective ways to reduce the risk of injury.

When landing, players should avoid excessive twisting movements. Often when landing from a jump or manoeuvre, momentum causes the upper body to twist and rotate in relation to the legs, placing the joints, muscles and ligaments under a large amount of stress. Agility and balance training can improve players' ability to orientate themselves correctly with their direction of motion and thus avoid undesirable twisting movement on landing.

THROWING AND KICKING

When kicking or throwing for distance, players should try to involve many body segments and get as much power as possible first from the large muscle groups in the trunk (hips and torso). Energy from the trunk can be transferred to the involved limb (arm or leg) to make the movement more powerful. To maximise performance and reduce the risk of injury to small muscles, the body segments should contribute to the movement in sequence i.e. one after the other starting from those closest to the trunk and finishing with the segment in contact with either the ball or striking object e.g. the hand or foot. When the goal is accuracy, the body segments should be used less in a timed sequence and

more in a "push-like" fashion (like the arm motion in playing darts).

GRIP AND POSTURE

Many sports require players to grip an implement such as an oar, bat, club, stick or racquet. Incorrect grip can not only contribute to poor performance but can lead to the accumulation of tissue damage and the development of overuse injuries. Correct grip usually involves a mid-range joint position so that when loads are applied the joint is not at a limit of its range of motion and the muscles crossing the joint are at their best lengths for developing force e.g. fully extending the wrist when trapping a hockey ball places the player's wrist and elbow at risk of injury. Coaches must ensure that learning the correct grip is a priority in young players' formative years.

Poor posture has been identified as a risk for injury in the workplace and can also be a factor in injury in the sporting environment. Natural postures, with the trunk and limbs not twisting or moving to end ranges of motion under load, are indicative of good technique. Some sports, such as rowing, equestrian and cricket, can be particularly demanding on the spine if correct posture is not used. Training in postural stability for both the trunk muscles and limbs and encouraging the use of good posture will benefit players in both sporting performance and injury prevention.

Practical guidelines on technique can be found in the "Technique" section of the *ACC SportSmart Coaches' Kit*.

References

1. Cross, M.J. General prevention of injuries in sport. In: Renstrom, P.A.F.H. (Ed.) *Sports Injuries. Basic Principles of Prevention and Care*. Blackwell Scientific Publications: Oxford, 1993.
2. New Zealand Rugby Football Union. *Principles of Rugby Coaching*. NZRFU: Wellington, 2001.
3. Netball New Zealand. *Level One Coaches' Handbook*, 2002.
4. Wilson, N.C. and Hume, P.A. *Netball – Your Body: Your Choice! An Injury Prevention Kit*. Netball New Zealand: Auckland, 1993.
5. Hay, J.G. *The Biomechanics of Sports Techniques*. 4th edition. Prentice Hall: Englewood Cliffs New Jersey, 1995.
6. Kreigbaum, E. and Barthels, K.M. *Biomechanics: A Qualitative Approach for Studying Human Movement*. Allyn and Bacon: Needham Heights, 1996.
7. Dufek, J.S. and Bates, B.T. Biomechanical factors associated with injury during landing in jump sports. *Sports Medicine*, 1991, 12(5): 326-337.