CASE REPORT

Mountain bike injuries and clipless pedals: a review of three cases

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The cases are reported of three off road cyclists with isolated soft tissue injuries to the right lower leg, caused by the chain ring as they struggled to release their feet from clipless pedals. Correct adjustment of the pedals to facilitate quick release of the feet is required to prevent such injuries.

Off road mountain biking is now a very popular recreation as well as a well recognised sport. Most injuries that occur are minor, such as skin abrasions and contusions resulting from the impact of falling on to unpredictable terrain. I present three cases in which significant soft tissue injury was sustained, from the cycle itself, as the rider lost control and failed to release his feet from the pedals in sufficient time.

CASE REPORTS

Three male patients, aged 23–42, presented over 10 months. They came off their cycles after losing control at moderate to high speed, and to the side rather than going over the handlebars. They were on well marked tracks with soft and uneven terrain and were wearing helmets and cycling shorts. No other cyclists were involved and none were riding competitively. All three presented acutely to the local general hospital with major soft tissue injuries to the right lower leg. No fractures were identified and they sustained no other injuries. Two had ragged lacerations extending over the medial border of the tibia. The dirty wounds were debrided and cleaned under a general anaesthetic. One had delayed primary closure, and the other had sufficient skin loss to warrant split skin grafting. The injury to the third cyclist extended more proximally and had damaged the middle third of the patella tendon. The wound was debrided and primary closure was achieved. However, as the joint capsule had been breached, the knee joint was thoroughly irrigated as a precaution against possible joint contamination. A full course of antibiotics was given and within three months they had all recovered sufficiently to return to cycling.

DISCUSSION

Over the last decade, off road cycling has become very popular, with a dramatic increase in sales of mountain bikes in the United Kingdom. In the United States, 8.6 million people rode their bikes off road in 1998, nearly double the number from 1993.¹ Injuries sustained from off road biking accidents have been well described, most being skin abrasions and contusions.^{2–4} With the high usage of helmets (80%),⁴ serious head injuries are, fortunately, rare. Most injuries occur while going downhill, with the more severe occurring when the cyclist is thrown off the bike as opposed to falling on to the side.^{5–6} Most bony injuries involve the upper limb, with the clavicle often being fractured.³ To see three patients with similar isolated soft tissue injury of the

right lower leg suggests a common mechanism of injury, and, from the history and pattern of injury sustained, the cause seems to come directly from the cycle itself.

Many cyclists use a clipless pedal system, which has been available since the mid to late 1980s for road cycles, and are now becoming more popular with off road bikes. To release the foot from the pedal, a twisting motion of the foot is needed. All the patients described not only had this type of pedal system fitted but they also struggled to release their feet in time when they lost control. As cyclists lose control, their natural response is to place their feet on the ground in an attempt to stop them toppling over. Late release of one or both of their feet can mean that they have insufficient time to keep their legs clear of the cycle. As the bike topples over to the left, the chain ring becomes more perpendicular to the cyclist (fig 1). In a desperate attempt to maintain balance, the cyclist forcibly places his foot on the ground, and the right leg then catches on the exposed teeth of the chain ring. The result is anything from simple abrasions to the more serious trauma described above. This can be made worse if the chain ring continues to turn, which may occur if the left foot remains stuck in its pedal. As none of the pedals had serrated surfaces, normally found on standard pedals to prevent normal footwear from slipping, it is unlikely that they contributed to the present injuries.

This type of injury is unusual, as major trauma caused specifically by the cycle is rare. It highlights, however, how important the tensioning mechanism on the pedal is. These pedals need to be correctly adjusted to facilitate the rapid release and adequate clearance of the lower limbs from the cycle. This would help to prevent such injuries from occurring. It is unlikely that these injuries would have occurred if the cyclists were unable to release their feet at all, as the position of the leg in relation to the chain ring would then be maintained. The mechanism of injury described

Figure 1 Right leg of cyclist catching on the exposed teeth of the chain ring after failure to remove feet rapidly enough from clipless pedals.

Take home message

In cycling, major injuries can be caused by the cycle itself. Proper information is needed to allow cyclists to use clipless pedals safely and effectively.

would therefore have been avoided. However, as he falls over, the rider would now be at increased risk of sustaining other injuries such as femoral neck fractures.⁷ It is my belief that consideration should be given to measures that would help to reduce the risk of harm to the rider, such as the addition of a chain ring guard. A similar system to that used in skiing, allowing the pedals to be altered on the basis of factors such as the rider's ability and weight, may help to make the correct adjustments easier.

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