Clinical

Anterior cruciate ligament injury in Royal Marine basic training


Introduction
Previous anterior cruciate ligament (ACL) reconstruction is currently a contraindication for entry to the Royal Marines and Royal Navy. Current Royal Marine policy is to rehabilitate recruits who sustain an ACL disruption during training.

Method
We identified all Royal Marine recruits who had sustained an ACL injury during their training between 2003 and 2011. We retrospectively analysed their rehabilitation and looked at their rates of completing Commando training.

Results
Twelve recruits sustained an ACL injury during the study period, representing an incidence of 0.15% per recruit per year. Nine of these recruits underwent ACL reconstruction during training, seven of whom went on to complete Commando training. All recruits who had their ACL injury managed non-operatively failed to complete Commando training.

Conclusion
ACL injury is uncommon in Royal Marine training. Whilst it is associated with a long rehabilitation time, it is not a barrier to successful completion of Commando training. Our results suggest that surgical reconstruction is associated with a greater rate of training completion compared with conservative management.

Introduction
Previous anterior cruciate ligament (ACL) reconstruction is currently a contraindication for entry to the Royal Marines and Royal Navy (1). Currently, the Royal Marine practice is to rehabilitate recruits who sustain an ACL disruption during training.

Royal Marine Commando training is amongst the most arduous military training in the world, and is particularly stressful on the knee joint. Not only does it include ‘yomping’ (carrying loads in excess of 60kg while speed-marching) but also running over uneven ground carrying weight.

All Royal Marine recruits who sustain a significant injury during training are taken out of training and entered into a rehabilitation program (Hunter Company) until they have recovered sufficiently to return to Commando training. Once an ACL rupture has been identified recruits are offered an ACL reconstruction. If recruits choose to undergo an ACL reconstruction, post-operatively they return to Hunter Company for their rehabilitation until they are ready to return to training. Those who choose not to have an ACL reconstruction stay in Hunter Company in order to improve lower limb strength and stability in an attempt to compensate for the lack of an ACL and with the ultimate aim of returning them to training.

The aim of this study was to identify the incidence of ACL injury in Royal Marine recruits and analyse their rehabilitation and rates of completion of Commando training.

Methods
Through a retrospective review of medical and rehabilitation service medical notes the authors identified all Royal Marine recruits who had sustained an ACL injury during their training between 2003 and 2011. We selected only recruits who had sustained a complete ACL rupture confirmed on MRI. Their rehabilitation outcomes were subsequently evaluated using rates of completing Commando training as the main outcome measure.

Results
Twelve recruits suffered an ACL injury during the study period, which represents an incidence of 0.15% per recruit per year.

Nine of the twelve recruits chose to undergo an ACL reconstruction in a local district general hospital. All underwent arthroscopic ACL reconstruction and all entered
a standard ACL rehabilitation regime, lasting between nine and twelve months at the Commando Training Centre Royal Marines (CTCRM). Of the nine patients in the operative group, seven (78%) went on to complete Commando training. Of the two recruits who underwent ACL reconstruction and subsequently failed to complete Commando training, one was unable to regain enough fitness and recovery in his knee to return to training and the other left the Royal Marines for unrelated reasons. The mean total time removed from training for successful recruits was 51.6 weeks, of which the mean time after ACL reconstruction was 36.7 weeks.

Recruits who chose non-operative management were managed by rehabilitation alone, with a progressive lower limb rehabilitation regimen followed by military-specific re-entry tests at CTCRM: despite this intensive rehabilitation and military training, none went on to complete Commando training.

**Discussion**

ACL injury is relatively uncommon in Royal Marine basic training, with an incidence of 0.15% per recruit per year. This is higher than the reported corresponding incidence in a civilian population of 0.05% per person per year (2), but similar to the incidence reported in professional athletes 0.15 – 3.7% (2). It is also lower than published rates for the US military, 0.37% (3).

This study has shown that following ACL reconstruction there are good rates of completion of Commando training. It is difficult to compare this finding to the current literature, as there are different 'success' rates reported following ACL reconstruction depending on the population investigated and their defined outcome measure. The most commonly used outcome measure seems to be return to sports, which can vary from 100% return to recreational cycling at four months post ACL reconstruction (4) to a 19% reported return to competitive football at seven years (5).

There are clear limitations to our study, with it being a retrospective study and with low numbers. Our outcome measure of completion of Commando training also has potential limitations. This is clearly a multi-factorial outcome with physical components which are directly related to an individual’s function following an ACL reconstruction, but there are also physical and psychological components to completing Commando training which are unrelated to the success of the ACL reconstruction.

Our study also does not take into consideration the longer term implications of an ACL injury, since there was no follow-up after completion of Commando training. It is well documented that there is a strong association between ACL injury and the onset of early osteoarthritis (OA), with an incidence of about 50% at 20 years after injury (6). There is good evidence that ACL reconstruction does help to prevent further intra-articular injuries such as meniscal tears which are associated with increased incidence of OA. (7) At present there is little evidence that an ACL reconstruction will reduce the risk of developing OA in the future.

**Conclusion**

ACL injury is relatively uncommon in Royal Marine training. Whilst it is associated with a long rehabilitation time, ACL injury and reconstruction does not appear to be a barrier to successful completion of Commando training. In our study, surgical reconstruction of the ACL was associated with a higher rate of completion of Commando training, compared with non-operative management. Our study seems to support the current practice of rehabilitating Royal Marine recruits following an ACL injury, and offering them an ACL reconstruction. However further research into ACL injuries in Royal Marine recruits is needed, as well as looking at the longer term outcomes and employability of Royal Marines who have sustained an ACL injury during training.

**References**


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