Clinical

Selecting the Correct Emollient for the treatment of Dry Skin in Cold Weather Warfare Training

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Introduction
From January to April every year the Mountain Leader Cadre of the Royal Marines deploys to Norway to conduct the selection and training of the Mountain Leaders for the Royal Marines. Currently training is conducted in Northern Norway at Porsangermoen, which is located at 70 degrees North in Finnmark. With air temperatures dropping below -30 degrees Celsius and combined wind-chill temperatures below -55 degrees Celsius, dry skin on the face is a difficult problem to address. It has previously been noted that there is limited experience within the Royal Naval Medical Branch (1) of operating within the Arctic and that there is a significant Royal Naval medical input required to support Royal Marine training (2,3) and operations due to the intensity of their training and operations.

Since the demise of the requirement to defend NATOs Northern flank, there have only been a few personnel deploying to Norway on an annual basis, partly due to Iraq/Afghanistan commitments, however 3 Commando Brigade is still keen to maintain a capability, therefore it is important that what knowledge is still around is shared with other service medical personnel as there is a likelihood that as 3 Commando Brigade becomes less committed to Afghanistan that Norway deployments become larger and more frequent.

It is a common belief that waterless ointments have protective qualities against frostbite (4), although some epidemiological studies (4,5) are now starting to question the wisdom of this belief. Currently it is not the practice of the British Military to provide emollients in order to prevent frostbite and this paper is only looking at our experience of treating dry skin in an extreme cold weather environment.

The primary care medical module (6) contains E45 for the moisturising of skin, however it is currently our practice to augment the generic 501 module with medication appropriate for the extreme environments operated in by Royal Marine Commandos. The two emollients we used were E45 cream which is White Soft Paraffin BP 14.5%WP and Light Liquid Paraffin 12.6% and Double-base Cream Emollient which is 15% Isopropyl myristate and 15% liquid paraffin and was brought out as an addition to the module. Drapolene was used whilst on camp, however as this freezes at low temperatures in comparison it is completely inappropriate to use in field conditions.

We present our anecdotal experiences about using the emollients in a cold weather environment in order that other medical staff deploying to the Arctic can consider our experience and augment their primary care modules if considered necessary.

Method
5 Royal Marines Mountain Leaders were treated during Mountain Leader training in Northern Norway during January-April 2011 initially with E45 cream and were subsequently changed to Double-base cream whilst in the field. When back on camp the patients were treated with Drapolene Patients perceived outcomes and complaints were noted.

Results
All 5 patients were initially started on E45 cream, however after all of them complained of non-resolution of symptoms they were switched onto Double-base cream whilst in the field. All 5 had improvement of symptoms on Double-base cream.

All 5 patients felt that the Double-base cream was better absorbed than E45 in extreme low temperatures.

Other complaints about E45 were that it formed thick lumps on the skin at low temperatures, which would not rub in and produced red itchy inflamed areas under unabsorbed E45 when removed.

There were no recorded incidences of facial frostbite in the patients.

Discussion
We recognise that this is not a well, designed scientific study into the application of emollients in cold weather and it is important that our findings are viewed as our experience rather than sound scientific results. However none of the authors have any undisclosed interests in either product, but feel that our experience is relevant to the whole Royal Naval Medical Branch. Whether this is Medical Officer or Medical Assistant serving on an Arctic/Antarctic bound ship or a Surgeon needing to treat his own dry skin in a deployed Commando Surgical Team in the Arctic, or any level of medic supporting 3 Commando Brigade deployed in
Norway or similar climes.

The fact that the 501 Primary Care modules does not include any Emollient that we regard as suitable for use in the Arctic, reflects the fact that this is a generic module. This module is not designed for a particular theatre, and certainly not the Arctic. This may be due to the fact that only the Royal Marines and Royal Navy have current subject matter experts on operating in the Arctic and even here there has been a decrease in corporate knowledge about what is required. Therefore this knowledge may not have been available to the teams assembling the 501 module. This is compounded by the fact that even in the Royal Navy many Medical Assistants, Medical Support Officers and Medical Officers have not deployed to these conditions, and on the whole those that have, have a limited current experience of treating patients in the Arctic having on the most part only deployed once or many years ago (1).

In our experience, we believe that the Double-base cream is better absorbed in low temperature environments and that our small patient group felt that when combined with the use of Drapoleune when back on camp there was a good resolution of symptoms when compared to a combination of E45 cream and Drapoleune.

It is important to note that there are studies that suggest water based emollients have a less protective mechanism against the cold than oil based emollients (7). We would not advocate the routine use of emollients to try and prevent frostbite, but would encourage the continued education of troops into the prevention of cold weather injuries by adequate understanding of the effects of wind-chill and the speed that frostbite can occur in low temperatures.

This combined with the continual improvement in kit and protective clothing.

We do believe that our experience highlights the difficulties and pitfalls of having a one size fits all primary care module and note that whilst the Royal Marines extensively research the characteristics of weapon systems and other kit in the Arctic and other environments this environmental specificity is perhaps not the case when we assemble medical modules.

We do not believe that it is only the Arctic that effects medication and its use, or that it is only emollients that are effected by low temperatures, and would encourage formal research into the effects of temperature on our kit and medication, as with the best will in the world it is impossible to prevent some medication freezing or cooling in low temperatures before and after issue to troops. We would also encourage the sharing of these experiences by other Royal Naval Medical personnel so that corporate knowledge is not lost from one generation to the next, and whilst information learnt in current landlocked desert based operations is useful it is important that we continue to develop and share our knowledge on our core commitments - operating in the Arctic, at sea and in the littoral.

It is recommended that medical personnel deploying to the Arctic or any other type of different climate have a meeting prior to deployment with subject matter experts to discuss climatic issues that affect the kit and medication, as well as those that effect personnel. We would also recommend that personnel deploying to cold environments consider adding Double-base cream in sufficient quantity to treat the number of personnel that they are managing.

Reference
7. Thorgeirsson, A. Wulf, HC. Emollients and the Response of Facial Skin to a Cold Environment British Journal of Dermatology 148(6) 1149-1152

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