Medical procedures on-board vessels

First Aid booklet for seafarers

Ona Nemlander

Mimmi Niiranen

Examensarbete för sjökapten (YH)-examen

Utbildning i sjöfart

Åbo 2019

EXAMENSARBETE

Författare: Ona Nemlander och Mimmi Niiranen

Utbildning och ort: Sjökapten, Åbo

Handledare: Ritva Lindell

Titel: Medical procedures on-board vessels

Datum 14.11.2019 Sidantal 12 Bilagor 1

Abstrakt

Syftet med detta slutarbete är att producera pedagogiskt material som behandlar maritima medicinska åtgärder. Som kan användas som undervisningsmaterial på kurser, samt självstudier och repetitionsmaterial ombord på fartyg.

Sjukvårdskurserna förnyas vart femte år, ifall färdigheterna inte tillämpas praktiskt under dessa fem år är det möjligt att i en akut situation glöms de lärda färdigheterna. Användning av instruktionsvideon samt skriftliga instruktionerna som repetitions material mellan kurserna skulle minska glömska i akuta situationer.

Instruktionsvideor och skriftliga instruktioner av avhandlingen är begränsade till innehållet i skeppets apoteket.

Slutarbetet, instruktionsvideorna och skriftliga instruktionerna är på engelska så att materialet också kan användas internationellt. Vi har baserat arbetet på första hjälpens undervisningsmaterial samt maritimt medicinskt material.

Språk: engelska Nyckelord: medicinska procedurer, första hjälpen

---

OPINNÄYTETYÖ

Tekijä: Ona Nemlander ja Mimmi Niiranen

Koulutusohjelma ja paikkakunta: Merikapteeni, Turku

Ohjaajat: Ritva Lindell

Nimike: Medical procedures on-board vessels

Päivämäärä 14.11.2019 Sivumäärä 12 Liitteet 1

Tiivistelmä

Opinnäytetyön tarkoitus on tuottaa opetusmateriaalia merenkulun lääkinnällisistä toimenpiteistä, joita voidaan käyttää kursseilla opetusmateriaalina sekä aluksilla itseopiskelu- sekä kertausmateriaalina.

Merenkulun lääkinnälliset kurssit uusitaan viiden vuoden välein, mikäli opittuja taitoja ei sovelleta käytännössä näiden viiden vuoden aikana, on mahdollista, että akuutissa tilanteessa opitut taidot unohtuvat. Opetusvideoiden sekä kirjallisten ohjeiden käyttäminen kertausmateriaalina kurssien välissä itsenäisenä opiskeluna tai/sekä harjoitusten yhteydessä, voivat vähentää muistamattomuutta akuutissa tilanteessa.

Opinnäytetyön opetusvideot sekä kirjalliset ohjeet ovat rajattu laiva-apteekin sisällön mukaan.

Opinnäytetyö, opetusvideot sekä kirjalliset ohjeet ovat englanniksi, jotta materiaalia voidaan käyttää mahdollisimman laajasti. Opetusvideoiden sekä kirjallisten ohjeiden aineistona on käytetty niin ensihoidon opetusmateriaalia, kuin merenkulun lääkinnällistä materiaalia.

Kieli: englanti Avainsanat: lääkinnälliset toimenpiteet, ensiapu

---

BACHELOR'S THESIS

Author: Ona Nemlander and Mimmi Niirane

Degree Programme: Maritime management, Turku

Supervisors: Ritva Lindell

Title: Medical procedures on-board vessels

Date 14.11.2019 Number of pages 12 Appendices 1

Abstract

The purpose of this thesis is to produce educational material of maritime medical procedures that can be used as teaching material on courses, as well as self-study and refresh material on-board vessels.

The maritime medical care courses are renewed every five years, if the learned skills are not used during these five years; it is possible that the learned skills will be forgotten in an acute situation. Using instructional videos as well as written instructions as a refresher between courses as a self-study or / and exercises, would reduce the forgetfulness in an acute situation.

The instructional videos and written instructions of the thesis are limited to the contents of the ship's pharmacy.

The thesis, instructional videos and written instructions are in English for the widest possible use of the material. Instructional videos and written instructions are based on both first aid teaching materials and maritime medical materials.

Language: English Key words: medical procedures, first-aid

Table of contents

1 Introduction

As a working environment, the ship is challenging. The ship's spaces are often cramped and unsteady, with many stairs and generally they are steep ones. Weather conditions set additional challenges, such as the ship's rolling, the slipperiness outdoors and extreme temperatures. The ship is also mentally challenging, usually a small community and an enclosed environment, as well as the constant rush and low rest hours. These are a few main causes of stress in seafarers.

Onboard ships illnesses, injuries and accidents need to be dealt with locally, in the Baltic Sea we are lucky that help is always nearby, but this isn't always the case out on the bigger seas. As a medical care environment, the ship is more challenging. Not all ships have nurses, but in that case one of the officers must have medical care training, this officer is called, medical store manager.

The ship's officer has been trained in medical courses, as defined by the International Labour Organization (ILO) and the IMO Maritime Safety Committee (MSC), for a total of three courses. Courses are fast-paced and last only for a few days. One of the courses is repeated every five years and if the learned skills are not used in these five years, it is possible that the learned skills might be forgotten in an acute situation.

The limited scope of the ship's pharmacy restricts medical procedures. The content of the ship's pharmacy is defined by law, depending on the size of the crew and the vessel's operating area.

The aim of the thesis is to produce an educational material on maritime medical procedures that can be used as teaching material in courses as well as self-study and refresh material on-board vessels. The material consists of be instructional videos as well as written instructions and it will focus on the acute life-saving actions.

Today, Finnish shipping companies operating in the Baltic Sea have multinational crew and English is the working language for most ships. That is why the thesis, instructional videos and written instructions are in English, so that the material can be used as widely as possible. Instructional videos and written instructions are based on both first aid teaching materials and maritime medical materials.

2 Purpose and the delimitation

The lack of teaching videos in medical care made Novia University of Applied Sciences order them as thesis project. To have full advantage of the videos, we decided to take it a bit further, First aid booklet for seafarers; step-by-step written instructions with the videos to be used as teaching material at courses and as self-study materials on-board vessels, because when accident occurs on-board there is no one but the crew that can help and therefore it is important to improve the medical care skills of the seafarers.

The aim for the booklet was to be able to provide the user somewhat wide range of in-depth information about procedures, information of things to consider while executing

the suggested medical procedures, normal basic vital values, common mistakes made and how to avoid them.

To choose and limit the videos and instructions we consulted Medical Care teacher Ritva Lindell and read a thesis about occupational accidents among ships engine and deck crew. We also delved into the legislation concerning medical care on board vessels; The Act on Ships medical stores, contents of ships medical stores and the contents of medical care courses.

3 Theoretical starting points

3.1 OnBoard-Med - project

As a part of the OnBoard-Med –project Niina Kuikka and Veera Kulmala (Turku University of Applied Sciences, Degree programme in nursing, 2018) made a thesis about occupational accidents among ships engine and deck crew.

> "Maritime industry is one of the most demanding professions and the industry has a high number of accidents. Machinery and deck crew have the greatest number of occupational accidents. The circumstances of the ship have a significant impact on the occurrence of accidents. Indicate use of protective equipment's and failure to observe occupational safety regulations are a major risk of occupational accidents. A human error is related to several ship accidents. Significant factors on the creation of them are fatigue and stress. The risk factors are also the young age and inexperience.
>
> The most common accident causes are falling, slipping, stumbling or dropping and accidents associated with the use of machines and winches. Occupational accidents at seafarers are for example sprains, wounds, bruises, abrasions and illness or injury due to the breathing gas or vapor or corrosive substances. Noise and vibration injuries and fire and frostbite injuries include in these. Heavy seas cause occupational accidents and deaths are caused in particular by maritime traffic accidents. Also piracy is a serious threat." (Kuikka & Kulmala, 2018)

This research gave us more information about the actual causes of accidents and the type of accidents on-board vessels and helped us to limit the topics we would tackle.

Even though the mild injuries and illnesses such as bruises, small cuts and flu are the most common on-board vessel's, those are also the easiest to take care of. We limited the instructions acute life-saving actions, which are not that common and therefore needs repetition.

3.2 Legislation

In the maritime world there's several different laws and regulations that define cargo handling, working hours etc. medical care onboard ships is also affected by many of these laws and regulations. *The Act on Ship' medical stores* determine the drugs and medical supplies carried on-board according to the vessel category, the number of crew members and if the vessel is carrying dangerous goods. It also states that the master and

the medical store manager must have valid document on medical care. (Act on Ships' Medical Stores, 2015)

3.2.1 Act on Ships' Medical Stores

In Act on Ships' Medical Stores it is determined that the Act applies to vessels sailing under the Finnish flag with crew personnel working on board. (Act on Ships' Medical Stores, 2015)

3.2.1.1 Categories

In section 2 in the Act it is determined to which vessels the Act applies and which not. Generally, you can say that the Act applies to vessels that are more than 10 metres in length and are regularly used in general traffic for the carriage of passengers or cargo.

In section 4 in the Act the vessels that the Act applies are categorized in A, B, C and D as follows:

> "1) category A comprises vessels operating beyond the limitations set for vessel categories B, C and D;
>
> 2) category B comprises vessels operating within a maximum of 150 nautical miles of the nearest medically adequately equipped port of a European Union Member State or Norway; category B also includes vessels operating within a maximum of 175 nautical miles of the nearest medically adequately equipped port of a European Union Member State or Norway, if the vessel can at all times be reached by a rescue helicopter;
>
> 3) category C comprises vessels operating within a maximum of 50 nautical miles of the nearest medically adequately equipped port of a European Union Member State or Norway;
>
> 4) category D comprises vessels engaged on domestic voyages. " (Act on Ships' Medical Stores, 2015)

The quantity of medicines and medical supplies are depending on vessels category, as the category A has the most and D least.

3.2.1.2 Contents of ship's medical store

Contents of ship's medical store are determined in section 6 in the Act:

> "A ship's medical store must carry a sufficient quantity of drugs and medical supplies which is determined by the vessel category and the number of crew members, a first aid kit, a medical journal, necessary guides regarding first aid and medical care provided on board, and this Act and the provisions issued under it.

> Vessels carrying dangerous goods must hold drugs and medical supplies which are required by the cargo carried to prevent and treat direct and indirect adverse effects caused by the dangerous goods." (Act on Ships' Medical Stores, 2015)

In the Act dangerous goods are defined as substances which, due to a risk of explosion, fire, infection or radiation, or due to their toxic or corrosive nature or other similar feature, may cause damage to people, the environment or property; dangerous goods also include mixtures, articles, devices, goods and empty packaging's containing hazardous substances. (Act on Ships' Medical Stores, 2015)

In section 5 in the Act states that

> "The master shall decide whether the medical store should carry more drugs and medical supplies than what is required by the provisions issued under this Act; however, the medical store may not hold more drugs classified as narcotics or agents that influence the central nervous system than what is specified in the provisions issued under this Act." (Act on Ships' Medical Stores, 2015)

For example, it is not mandatory to have a defibrillator on-board cargo ships, even if they are carrying dangerous goods. It takes approximately 45 minutes for the helicopter to reach the vessel in 140 kilometres (75 nautical miles) and while having situation where defibrillator is vital part of the treatment even 15 minutes is an extremely long time. Therefore, we encourage all shipowners to add a defibrillator to their ship medical stores.

3.2.2 First Aid and Medical Care Courses and Training under STCW for Seafarers

International Labour Organization (ILO) and the IMO Maritime Safety Committee (MSC) have endorsed guidelines for First Aid and Medical Care courses to provide complementary advice to national maritime administrations, medical practitioners and organizations in the shipping industry. (Edumaritime, 2019)

3.2.2.1 Elementary First Aid

The 1-day model course in Elementary First Aid provides training in elementary first aid at the support level and is based on the provisions of table A-VI/1-3 of the STCW Code and consists of both theory and practical exercises. Elementary First Aid course is one of the mandatory STCW Basic Safety Training courses designed to meet the minimum requirement for familiarization and basic safety training for seafarers with designated emergency duties. (Edumaritime, 2019)

In general, the course deals with the basics of lifesaving first aid as well as the further first aid measures to be taken in connection with acute cases of illness or accidents on-board vessels.

3.2.2.2 Medical Care

The 5-day model course in Medical Care provides training in elementary first aid at management level and is based on the provisions of table A-VI/4-2 of the STCW Code and consists of both theory and practical exercises. Medical Care course is for seafarers designated to be medical store managers.

On the course participants will acquire sufficient knowledge of medical stores and equipment on board with basic skills and knowledge to give first aid in case of an illness or various kinds of accidents. Furthermore, the participants will familiarise themselves how to describe the situation and consult a doctor and use the MFAG (Medical First Aid Guide for Use in Accidents Involving Dangerous Goods). (Edumaritime, 2019)

This course is the one course which must be renewed every five years to have valid certificate on medical care.

3.2.2.3 Medical First Aid

The 4-5-day model course in Medical First Aid provides training in elementary first aid at operator's level and is based on the provisions of table A-VI/4/1 of the STCW Code and consists of both theory and practical exercises. Medical First Aid course is for seafarers designated to provide medical first aid on-board. On the course participants will gain sufficient knowledge to give first aid in case of an illness or various kinds of accidents onboard. The course deals with hygiene, aseptic, assessing the need of help and containing the spread of diseases. Furthermore, basic resuscitation and the use of a defibrillator as well as the first aid in the case of a spinal injury, fractures, poisonings and injuries caused by heath or cold. (Edumaritime, 2019)

3.2.2.4 Summary of first aid and medical care courses

The model courses have only 11 days training in total. In these three fast-paced courses participants should gain almost the same knowledge as nurses in three years, which is impossible. Due to fast-paced courses with a lot of new information the probability to forget some of it increases. Therefore, this thesis is meant to be used to refresh the learnt knowledge from the courses.

4 Used publications

For the instructional videos and written instructions, we used both first aid teaching materials and maritime medical materials and consulted Medical Care teacher Ritva Lindell and nursing teacher Hanna Limnell from Novia University of Applied Sciences.

From the first aid teaching materials we received in-depth instructions for the diagnosis of symptoms, as well as clear work instructions, up to medical treatment. However, the

books have been written from an ambulance perspective, so we had to apply the instructions to the maritime environment.

The marine medical material has been written in accordance with the maritime environment and its' equipment, this material helped us adjust the first aid teaching material to the marine environment. Medical Care teacher Ritva Lindell and Nursing teacher Hanna Limnell were also a great help when the ambulance and hospital equipment was applied to the medical equipment of the ship.

5 Making the first aid-booklet

There was a lot of material for the thesis to read and dig into. We studied the legislation that defines the contents of the ship's pharmacy and the courses that are defined by regulation and their content. We had books on first aid education and medical handbooks for seafarers. In addition, we have attended all three medical care courses.

The first aid booklet's instructions were limited by the request of medical care teacher Ritva Lindell and based on the Kulmala and Kuikka thesis. The first aid booklet's content focuses on acute life-saving procedures onboard vessels.

5.1 Difficulties

We learned ourselves about emergency first aid on land, and we got good information from the first aid teaching materials. The materials we met dealt mainly with emergency first aid at the accident site and ambulance treatment. In a way, the same treatments that can be given on board a ship in the event of an accident.

Considering the education materials for first aid on land-based facilities, we stumbled upon a couple of comparisonal challenges. The first problem here was the sheer equipment of the ambulance being better and coming at a wider range of materials compared to the ship's pharmacy. Followingly we found that the biggest difference between an ambulance and a ship is that it is much easier for an ambulance to get additional units on site for further assistance. In severe accidents, several ambulances are able to attend the scene, in many cases having an actual doctor with them directly to the site, and transport to the hospital is also much faster. Of course, it is also possible to send a doctor to the ship if weather conditions and trading areas are suitable for safe operation. As a shore-based option ships have the opportunity to consult a doctor through Radio Medical which has become a very common policy when dealing with first-aid or medical situations onboard. Furthermore, depending on the size of the vessel, the nominated first-aid staff may not be more than two pairs of hands which can sometimes restrict the on-site first-aid somewhat severely.

From the first aid teaching materials used as reference materials for this thesis, we received a well assembled information package upon step-by-step instructions on how to deal with various accident situations, what equipment to use and which medicines to

administrate to casualties. However, the problem was and still remains that the same medical equipment or drugs were simply not available at the ship's medical store. To adjust these, we got help from the Medical handbook for seafarers and Medical Care teacher Ritva Lindell.

To bring up a concrete example, let's use Ringer's infusion fluid, which is commonly used both in hospital care and ambulances, but is not available in the ship's pharmacy. This can luckily be replaced by basic saline solution in our instructions according to Ritva Lindell and it is the best alternative in ship's medical store.

While filming the instructional videos related to this thesis, we also found a quite widely relatable problem. Although we've been to the all three medical care courses in the last four years, we realized how difficult it is to recall all the important steps in the correct order, while needing the videos the come out absolutely perfect. We were forced to study the various scenario-related guidelines again and again on what to actually do in different emergency situations. If nothing else, this problem pinpoints and underlines the purpose and the practical need for our thesis, since the medical courses are actually very fast-paced and extremely intense with the wide range of knowledge and proficiencies to be obtained within them.

5.2 Scriptive difficulties

5.2.1 Booklet

When starting the written part of work with the booklet attached to this thesis, we used the scripts for our instructional videos as a base. The first challenge here, was not only to bring the information to a complete and full set of instructions, but also the immense need of more in-depth information. The first aid booklet is constructed of the ABCDE method procedure tables which contain in-depth information of emergency care procedures.

In order to provide this extended information in a full and complete form, we had no choice but to go back to our chosen reference materials for further research and knowledge-gaining. Furthermore, we wanted the booklet to be able to provide the user with a somewhat wide range of in-depth information about procedures, information of things to consider while executing the suggested medical procedures, normal basic vital values, common mistakes made and how to avoid them. Also, the textual material of the videos is found in the booklet.

The textual references were made by using the IEEE method in order to keep the reading material as user-friendly as possible.

Again, another challenge was created by using reference materials of a different language than the language of the product of our work. We deliberately chose to use material of our own native language (Finnish) in order to guarantee a full understanding and comprehension for us. Finding the right terms and vocabulary for our booklet and

instructional videos was at times difficult, but this can definitely be considered as a very valid learning experience for us both.

5.2.2 Script writing process

Writing the scripts for the instructional videos was not as hard as we originally thought. The main focus we felt the need of keeping, was to make sure that every single detail was presented in a form that would be easily grasped without a chance of gross misunderstandings. We were able to successfully draw out solid step-by-step emergency procedure instructions from the first aid material along with the Medical handbook for seafarers. In addition to clear and visually satisficing video material, our ambition was to develop guidelines so crystal clear, that they could even be followed without actually seeing the videos, which we felt might be able to cause challenges in some scenarios.

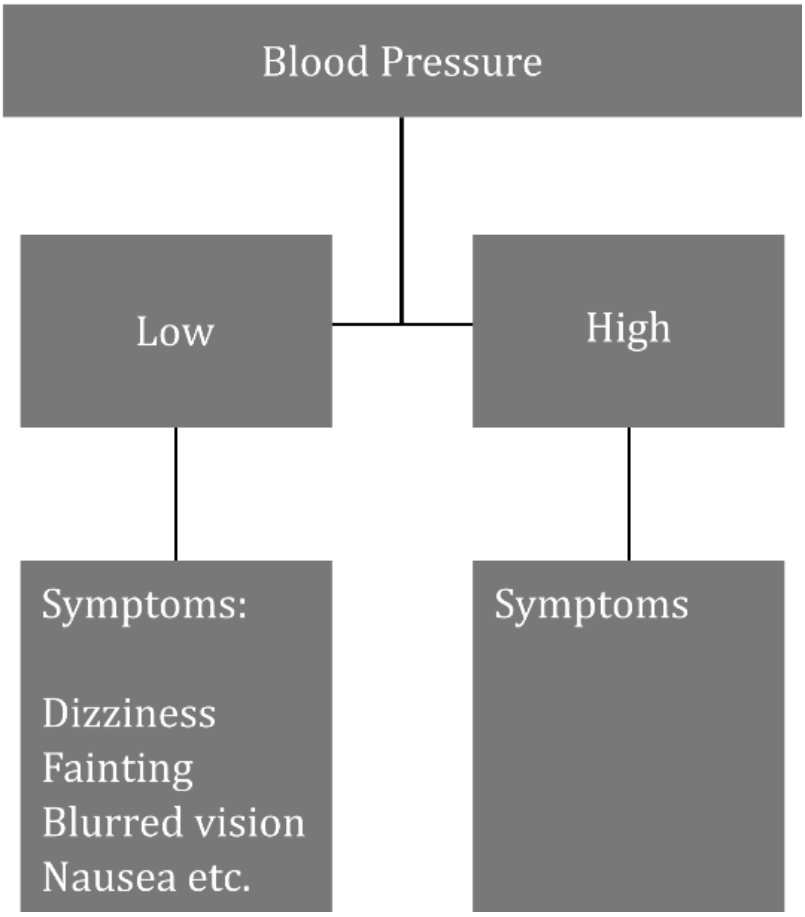
5.3 Technical difficulties

For the actual publishing of the finished work, we pondered for a long time upon which surface we would give the booklet out. Majority of ships usually have Microsoft Office programs on most computers, and we wanted to make the booklet usable even without internet.

The booklet was decided to contain not only step-by-step instructions for caring due to accident or illness, but also complete video-instructions, with vocal instructions and subtitles. Needless to say, the ambitions of the complete material were big, and therefore the publishing platform needed to be chosen extremely carefully in order to avoid any problems or clashes for the end users.

Our original thought was to make the booklet into an electronic book, where you could click on the table of content and it would take you straight to the desired instructions. Furthermore, there was a desire to also provide the opportunity for browsing different symptoms, in order to land on the fitting step-by-step instructions and having the instructional videos at the user's disposal.

The family tree table found on Microsoft Word was the closest option to our original idea, in which we would have been able to link the videos to the document via the online video service YouTube. The only controversy of using this method was the fact that it would not have resolved our idea of not needing internet.



Also adding the subtitles would have been easy through YouTube, which made the video service a very tempting alternative for our purposes. The problem turned out to be that YouTube found our videos visually disturbing and harmful, gave us a written warning to our account and carried on by deleting our video from the server. This experiment lead to the issue of us not being able to publish our videos on YouTube nor use the site to link the videos to our booklet.

This created the need for us to figure out another a smooth functioning way to share them with the school and shipping companies. The end idea of sharing the material is to hand out the booklet as a PDF file and the videos thru Google Drive to download which should be the optimal solution in order to guarantee problem free access for the end users.

5.4 Video editing

For the editing we used a smart phone application called iMovie. The choice was quite simple, since the editing work suddenly became rather uncomplicated, while already having the video material on the mobile device which deleted the need of using additional devices for editorial purposes. Using a smart phone application also made the editorial work easily accessible and widely mobile everywhere.

In the application the user is able to pick and combine several videos and photos for building up a video. The app also provides editing opportunities for splitting the video, duplicating or speeding up. With the use of this specific app, we were also able to create a voice over for the videos, so we didn't have to speak whilst filming, which made it a whole lot easier. The only real issue was that there was no way to get the subtitles onto the videos.

Since the original idea of using YouTube for easy subtitling massively failed, there was again a need to find other options for the job. We ended up building notes on the laptop which we then transferred into the Aegisub program, in which we then had to time the subtitles along to actions and the vocals on the videos. The final step of our video editing was to burn the subtitles onto the videos, for which we used the program called Handbreak.

When viewing the first edition of the videos with subtitles, we discovered that the videos would be in fact be more user-friendly without the subtitles. For this reason, the subtitles were left out, but the user still has the opportunity to follow the subtitles as written instructions in the booklet.

6 Self-evaluation

For our self-evaluation of the entire project we have a few points that we consider necessary to bring to discussion. Generically, the project should be divided into parts – instructional videos, booklet and the final form written thesis.

What comes to the instructional videos made for this thesis project, we feel quite satisfied. The never-ending room for errors certainly may implicate minor mishaps on detail while the whole ensemble remains correct on ready for use. In order to achieve mutual satisfaction amongst the team, the videos were performed, filmed and edited a few times over in order to keep improving the finished material.

For the booklet created we must admit partial defeat. The finished product is a good, wholesome and most importantly valid material to be used both onboard as well as shore-based course material which is able to provide ample and correct information to its users. What we feel is left lacking is a better platform of use and distribution, but still we are satisfied with our own work considering the resources and personal know-how within the creators. For future reference, we remain hopeful for someone to maybe someday publishing this into a booklet that would comply with our original plans.

For this final form of the written thesis we are satisfied. We feel that this paper brings out all necessary details of the work process, challenges faced and overcome as well as ample amounts of legislative aspects, refence material, definitions and purposes.

7 Final goals

For final goals to be reached for this complete thesis, we have a strong desire to be able to share the developed material with schools and shipping companies, in order for it to be actually used for both education and skill refreshing as was indicated from the start.

We would like to see our work being on the frontline of developing better skills and proficiencies amongst all seafarers what it comes to medical care and first aid scenarios onboard.

In order to achieve these ambitions, we plan on approaching shipping companies for offering out our material in a package form as soon as this project thesis is completed and approved.

8 Works cited and appendices

Act on Ships' Medical Stores. (08. May 2015). *FINLEX.* Haettu 01. February 2019 osoitteesta 584/2015: https://www.finlex.fi/en/laki/kaannokset/2015/en20150584.pdf

Alanen, P.;Jormakka, J.;Kosonen, A.;& Saikko, S. (2017). *Oireista työdiagnoosiin; ensihoitopotilaan tutkiminen ja arviointi.* Helsinki, Finland: Sanoma Pro Oy.

Bohn Hamming, M.;& Hansen, H. L. (2016). *Medical Guide for Seafarers.* Rødovere, Denmark: Seahealth Denmark / Søfartens Arbejdsmiljøråd.

Edumaritime. (2019, October 13). *Edumaritime*. Retrieved from What are the STCW Medical Courses? - IMO STCW Courses: https://www.edumaritime.net/stcw-courses/stcw-medical-courses

Kuikka, N.;& Kulmala, V. (2018). *Theseus.fi.* Haettu 13. February 2019 osoitteesta LAIVAN KONE- JA KANSIMIEHISTÖN TYÖTAPATURMAT JA NIIDEN ENNALTAEHKÄISY: https://www.theseus.fi/bitstream/handle/10024/147021/Niina_Kuikka_Veera_Kulmala.pdf?sequence=1&isAllowed=y

Kuisma, M.;Holmström, P. N.;& Porthan, K. T. (2015). *Ensihoito.* Helsinki, Finland: Sanoma Pro Oy.

Miilunpalo, P.;& Lindfors, H. (2019). *Laivasairaanhoidon käsikirja.* Helsinki, Finland: Finnish Institute of Occupational Health.

Naarajärvi, S.;& Telkki, T. (2016). *Ensiauttajan taskuopas.* Helsinki, Finland: Suomen Pelastusalan keskusjärjestö.

Oksanen, T.;& Turva, J. (2015). *Ensihoidon taskuopas.* Helsinki, Finland: Suomen Ensihoitoalan liitto ry.

Appendix I Medical First Aid Handbook

Medical First Aid

Handbook

Ona Nemlander

Mimmi Niiranen

Examensarbete för sjökapten (YH)-examen

Utbildning i sjöfart

Åbo 2019

TABLE OF CONTENTS

Preface

The purpose of this thesis is to produce educational material of maritime medical procedures that can be used as teaching material on courses, as well as self-study and refresh material on-board vessels.

The maritime medical courses are renewed every five years, if the learned skills are not used during these five years; it is possible that the learned skills will be forgotten in an acute situation. Using instructional videos as well as written instructions as a refresher between courses as a self-study or / and exercises, would reduce the forgetfulness in an acute situation.

The instructional videos and written instructions of the thesis are limited to the contents of the ship's pharmacy.

The thesis, instructional videos and written instructions are in English for the widest possible use of the material. Instructional videos and written instructions are based on both first aid teaching materials and maritime medical materials.

For the instructional videos and written instructions, we used both first aid teaching materials and maritime medical materials and consulted Medical Care teacher Ritva Lindell and nursing teacher Hanna Limnell from Novia University of Applied Sciences.

1 Life-saving first aid – ABCDE

Emergency first aid is a life-saving activity. Emergency first aid aims to prevent the patient from dying, by protecting the vital functions of the body: breathing, blood circulation and consciousness. [1]

Emergency first aid should be started immediately as the first few minutes are crucial to the patient's recovery. [1]

Emergency first aid measures include: situation assessment, rescue the patient from the danger, alerting of additional aid, respiratory protection, ensuring of blood circulation, suppression of major bleeding and treatment of shock. Remember to ensure your own safety first. [1]

It is useful to always follow the same formula in the patient's assessment of the situation. Internationally, the ABCDE method is used to examine a patient. [1]

ABCDE method ensures that you focus and act on what is most life-threatening for the patient. The method can be used for all acute possibly life-threatening situations such as accidents and critical illness. [2]

Always call Radio Medical if the patient requires life-saving first aid. [2]

On the following pages the ABCDE method is presented in two tables – ABC in one and DE in the following. We recommend printing these pages out and keeping them in the First Aid kit for quick access.

End of this chapter you will find also the written material of instructional videos of the medical procedures used in ABCDE method.

	SITUATION ASSESMENT	IMMEDIATE ACTION	EXTENDED EVALUATION
AIRWAYS	Open the airways - Lift an unconscious patient chin with two hands supporting the cervical vertebrae. [1,2,3]	Clear the airways - Look if there is anything in the mouth or throat. Remove it using fingers. [1,2]	If the patient can breath - make sure the airways stays open and put the patient into recovery position. [1,2,3]
	Fit a stiff neck collar in case of fall, crush injuries or if it is unclear how the accident happened. [2]	Make sure the airways stays open - Insert an oral airway if necessary. You should not insert the endothelial tube if the patient gags whilst inserting. [1, 2]	
BREATHING	Expose the chest - lift up the clothes or cut them off. [2]	Quickly assess the breathing rate - about 2 breaths in 10 seconds. [1,2]	**If the patient is NOT breathing start CPR immediately.** [1,2,3]
	See if the chest is rising falling. **Listen** if the breathing is normal, deep, shallow, laboured, whistling or rattling. **Feel** on your cheek whether the patient is breathing.[2]	Perform mouth-to-mouth or give air with the ventilation bag if breathing is very affected, shallow, irregular or absent. [1,2,3]	Give oxygen: If breathing is slightly affected, 6l/min in a mask. If heavily, 9l/min in a mask. If extremely shallow or delayed, 15l/min in a ventilation bag. [2]
CIRCULATION	Feel the pulse from the wrist and asses whether it is fast/slow, weak/strong, irregular/regular, count for 15 seconds. [1,2,3]	Check capillary response by pressing fingernail until it turns white - let go and see how long it takes to return normal. Longer than 2 seconds indicates a problem with circulation. [2]	If the capillary response is longer than 3 seconds, prepare to insert an intravenous needle and saline drip and call Radio Medical. [2]
	Check skin temperture - hot, cold, dry, sweating or cold sweats. [1,2,3]	Attach the oximeter. Oxygen saturation is normally over 95%. [2]	Monitor oxidation with the oximeter. Oxygen saturation alone does not guarantee sufficient breathing. [1]
	Check skin colour - pale, sallow, bluish, red, flushed or yellowish. [1,2]	Raise the legs if you suspect circulatory problems sot he blood from the legs goes to the vital organs. [1,2]	Attach the blood preassure meter: normal values for adult is 120-140/60-90 mm HG [1,2]
	Check for major bleeding. [1,2,3]	For major bleeding - Get an assistant to place a finger on the site of the bleeding and if possible raise it and apply tight dressing while proceeding with the life-saving first aid. [1,2,3]	
CONTACT RADIO MEDICAL			
REASSESS ABC [2]	Are airways open and clear?		
	How good is the breathing?		
	How is the capillary response and pulse?		
	How is the skin colour and temperature?		
	Are bleeding and wounds under control?		
	Is the drip working - is there free inflow?		

<table>
<tr><th colspan="4">EVACUATE TO SICKBAY IF POSSIBLE</th></tr>
<tr><td rowspan="4">DISABILITY</td><td>SITUATION ASSESMENT</td><td>IMMEDIATE ACTION</td><td>EXTENDED EVALUATION</td></tr>
<tr><td>Check the patient's level of consciouness:

Level 1: awake, alert and can provide information about them selves.

Level 2: unclear and affected but responds to questions.

Level 3: unclear and affected and only responds to pain.

Level 4: unconscious and does not respond to pain. [1,2,3]</td><td rowspan="3">If the patient is conscious and can breath -make sure the airways stays open and put the patient into recovery position. [1,2,3]</td><td>Examine the pupils:

Are the pupils circular - dialated or small?
Equal in size?
Reaction to the light? [1,2,3]</td></tr>
<tr><td colspan="2"></td><td>Rough neurological status using the FAST memory rule [3]:
FACE Ask the patient to smile, evaluate if the corner of the mouth is hanging.
ARM ask the patient to squeeze your hands with both hands, evaluate whether or not the strength is weakened or totally lacking.
SPEECH Evaluate the ability to speak, is it totally understandable or if it gets soggy.
TIME Ask the patient and everyone around about the timetable, how long ago did it start.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="3">EXPOSURE</td><td>Perform a head to toe examination on site or in sickbay. [1,2]</td><td rowspan="2">Start from the head, face and neck, then move to chest and stomack, then pelvis and arms and legs. 2

Back can be examined for pain and tendernes when the patient is turned on the side - "log roll". [2]</td><td>Measure blood sugar. [1,3]</td></tr>
<tr><td>Cut the clothes off so that you can examine the patient. [2]</td><td>Do breathalyzer test. [1,3]</td></tr>
<tr><td>Use clean disposable gloves and note if there is blood on your gloves. [2]</td><td>Protect the patient against cold. [3]</td><td>Measure body temperature. [1,3]</td></tr>
<tr><th colspan="4">Contact Radio Medical and report your findings</th></tr>
<tr><td rowspan="10">Radio Medical Record [1,2]</td><td colspan="3">Information about the patient and ship.</td></tr>
<tr><td colspan="3">What has happened.</td></tr>
<tr><td colspan="3">What has been done.</td></tr>
<tr><td colspan="3">General condition.</td></tr>
<tr><td colspan="3">Level of consciouness.</td></tr>
<tr><td colspan="3">Breathing frequency - normally 12 to 16 per minute.</td></tr>
<tr><td colspan="3">Oxygen saturation- normally over 95%.</td></tr>
<tr><td colspan="3">Capillary response - normally less than 2 seconds.</td></tr>
<tr><td colspan="3">Blood pressure - normal values for adult is 120-140/60-90 mm HG.</td></tr>
<tr><td colspan="3">Pulse- normally 60-80 per minute.</td></tr>
<tr><td colspan="3">Blood sugar test results.</td></tr>
</table>

[1] [2] [3]

1.1 Stiff neck collar

Make sure when placing the stiff neck collar to patient:

- Do not move the head
- Adjust to correct size
- Check that the patient's ears aren't under the collar

STIFF NECK COLLAR (video)

- One person needs to keep the head steady at all times
- The other person starts by measuring the length of the neck
- Place your hand on the shoulder muscle, and draw a straight line to the chin, how many fingers can you fit?
- Then place your palm on the collar, by the lower blue edge
- In our case all 4 fingers fit – tall

-Slide the Stiff Neck along the ground, avoid touching the patient

- Only so that the velcro is visible and easy to grab
- On the front side slide the stiff neck from the chest towards under the chin.
- Secure it with the velcro
- Make sure it's in a straight line with the chin and navel.

1.2 Face mask ventilation

FACE MASK VENTILATION (video)

- Make sure the airways are open
- Keep your hand under the chin and tilt the head backwards
- Place the face-mask on the patient
- Firmly but carefully press the ambu-bag against the forehead of the patient,
- Check that the chest is moving – air is going in the right place

1.3 Respiratory protection – an oral airway

The airway can be secured with a pharyngeal tube, laryngeal mask airway, laryngeal tube or intubation. Intubation devices are no longer part of the Ship's pharmacy. [1]

If the patient requires prolonged respiratory assistance, the respiratory tract may be secured with a laryngeal mask or I-gel. [1]

LARYNGEAL MASK AIRWAY (video)

- Choose the correct size according to weight of the patient
- Make sure the airways are open
- Empty the cuff of air with a syringe
- Rub some Xylocain onto the mask
- Place the mask in the mouth,
- Glide it backward and downwards until a resistance is felt (NO FORCE)
- On the package there is the amount of air that needs to be inflated into the cuff
- Attach the ambu-bag
- Make sure the chest moves along when pumping the ambu-bag
- Use some tape to keep the mask in the right place
- You can listen with a stethoscope to make sure everything is going correctly

I-GEL (video)

-Choose the correct size according to the patients weight

- Grasp the lubricated I-gel firmly along the integral bite block
- Position the I-gel so that cuff outlet is facing towards the chin of the patient
- The head should be with chin up, head extended and neck flexed.
- The chin should be gently pressed down before proceeding to insert the i-gel.
- Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate
- Glide the device downwards and backwards along the hard palate with a continuous but gently push until a resistance is felt.

1.4 Oxygen saturation

Pulse oximetry is an easy and reliable method for measuring blood oxygen saturation and detecting low blood oxygen levels. Normally the oxygen saturation in the blood is over 95%. [1]

If the pulse oximeter does not read, check that the sensor is properly attached. For example, nail polish or discoloration caused by tobacco can interfere with the operation of the device. [1]

The result of a pulse oximeter may be incorrect due to cold, low blood pressure or medication. Removing tight clothing and warming the peripheral parts by rubbing can help. [1]

In carbon monoxide poisoning, the device gives an incorrect normal saturation. [1]

PULSE OXIMETER (video)

- Make sure the nail is clean
- Place the finger in the oximeter,
- Put the machine on it will take a few seconds for the information to come up.

1.5 Blood pressure

Blood pressure is usually measured with a blood pressure monitor, but it can also be roughly measured without a monitor. [1]

If the patient's pulse is felt on the wrist, the systolic blood pressure is greater than 80mmHG. If the patient's pulse does not feel on the wrist but the pulse still feels in carotid artery, the systolic blood pressure is between 60 and 80mmHG. [1]

The risk of shock is evident if systolic blood pressure is less than 90mmHG and heart rate is greater than 120 per minute. [1]

AUTOMATIC BLOOD PRESSURE MONITOR (video)

- Place the cuff/manchette two fingers above front of elbow
- Tighten the cuff with the cords facing up along the arteries
- Turn on the machine
- It will give you values,
- And normal blood pressure should be about 120–140 / 70–85 mmHg

MANUAL BLOOD PRESSURE MONITOR (video)

- Place the cuff two fingers above the elbow with the arrow following the arteries.
- Make sure the vent is closed
- Start pumping pressure into the cuff
- All the way up until 160-180 mmHg, until you can't hear the pulse
- Place the stethoscope on the artery
- Slowly start releasing the pressure until you can hear the pulse again
- That's your systolic value, normally around 120-140
- Continue releasing the pressure until you can't hear the pulse,
- That is the diastolic value, 70-85

1.6 Evacuation

If the environment may pose a greater risk to the patient, the patient must be immediately transferred to a safer place for immediate first-aid procedures to save the patient's life. [1] [2]

When the patient's condition is stable, the patient can be transported either to the sick bay or inshore. Plan the evacuation route well. [1] [2]

When a patient is transferred on stretchers, the patient is attached to them so well that the patient remains firmly attached to them and the evacuation do not aggravate the injury. [1]

EVACUATION DRAG (video)

- Grab the person you need to evacuate under the arms, by the armpits
- Support the head with your elbows
- Make sure that you pull/work with your leg muscles so you don't pull your back.

EVACUATION (video)

- When evacuating a patient, you need at least 3 people, one to hold the head at all times, and two people cross-armed to turn the patient allowing you to put the blanket under them.

- Once you lay them back on their back, roll the blanket as close to their body as possible,

- Take a proper hold of the quilt and lift the patient,

- Place them on the spinal board

- Wrap them in the quilt, make sure the face is clear

- Wrap them in the hypothermia blanket

- And secure the patient with the straps to the spinal board,

- Remember to tie any loose ends

1.7 Blood sugar

For hypoglycaemia (low blood sugar) the values vary under 4mmol/l to under 3mmol/l.

- treatment for unconscious patient is 1 mg glucagon to the muscle
- treatment for conscious patient is sugar or honey. [1]

For hyperglycemia (high blood sugar) the value is usually above 15 mmol/l.

- treatment for hyperglycemia patient, contact Radio Medical. [1]

BLOOD SUGAR (video)

- You need, lancet or injection needle, absorbent paper towel, antiseptic, and test strip

- Place the test strip in the machine

- Clean with antiseptic the side of the fingertip that you intend to take the sample from

- Take the lancet, break the security cap, press it against the finger.

- The needle will make a small puncture

- Remember to wipe off the first drop of blood when you've used antiseptic.

- Take the machine with the test strip, absorb a little bit of the blood.

- It will give the values in about 6 seconds

- The normal values for a person that has fasted 6-8 hours are between 3.5 – 5.5 millimoles per litre

1.8 Intra venous – I.V.

If the fluid transfer does not seem to be working, check these [1]:

The roller clamp is closed.	Open the clamp.
A bend in the tubing prevents fluid flow.	Straighten the bend
The transfer fluid bottle or bag is too low, the transfer pressure is too low.	Raise the fluid bottle or bag higher.
The cannula is not in the vein but under the skin.	Reinsert the cannula, same arm, higher than the previous injection position.
The needle has been blocked by a blood clot.	Reinsert the cannula, same arm, higher than the previous injection position.

INTRA VENUOUS – I.V. (video)

Close the roller clamp
Insert the spike of the IV set into the solution bag or bottle
With a bottle, the air vent of the drip chamber should be open; with a bag, closed.
Squeeze the drip chamber up to the line or so that its half full
Open the roller clamp to remove the air bubbles
When all the air is out, close the roller clamp, suspend tube on IV stand

Use protective gloves.

Wrap the tourniquet around the patients forearm or upper arm.
Best insertion sites are at the back of the hand
Barely visible veins can be brought out by tapping them gently, massaging a cool limb or by lowering the limb slightly.
Clean the insertion point, centre outwards.

Take the IV catheter out from its package and spread out the wings

Stretch the skin with your thumb to stabilize the vein
Grab the catheter with the other hand
Pierce the skin with the catheter at a 30-45-degree angle, towards the heart
When the catheter has pierced the skin and the wall of the vein,
direct it into the vein parallel with the skin

When the wall of the vein is pierced blood will appear
Push it 0.5-1 cm into the vein
Pull the metal needle outwards about 1cm and push the catheter fully into the vein.
Open the tourniquet, press the vein with a finger and remove the metal needle

Remove the protective cap, at the end of the tubing, attach it to the catheter
Tape the catheter from its wings to the skin
Make a loop in the tubing and tape it to the skin
Hang the IV bottle above the patient and open the roller clamp, adjust flow rate
drops in the drip chamber per minute, 20 drops = 1 ml
standard flow rate is 15–20 drops/min, bleeding shock may require as much as 200 drops/min
Monitor the infusion constantly, and record the amount of fluid given and the infusion rate on the patient's follow-up form

2 Cardiopulmonary resuscitation – CPR

The aim of cardiopulmonary resuscitation (CPR) is to ensure necessary supply of oxygen to the vital organs for the patient. [2]

Even though the patient is not breathing, the heart still works for a while, delivering oxygen to the brain and other parts of the body. Rapid resuscitation may still save the patient. [1]

It is not mandatory to have defibrillator (AED - Automated external defibrillator) onboard vessels. We strongly recommend having one onboard, because if the heart stops due to ventricular fibrillation or pulseless ventricular tachycardia, plain CPR is insufficient to get the heart started again.

Always call Radio Medical if the patient requires life-saving first aid. [2]

On the following pages the CPR is presented in a table. We recommend printing the table and keeping it in the First Aid kit for quick access.

End of this chapter you will find also the written material of instructional videos of the medical procedures used in CPR.

CPR - CARDIOPULMONARY RESUSCITATION			
AIRWAYS	Ensure clear airways [1,2,3]	Tilt the head back and lift up the chin. [1,2,3]	
BREATHING	Check if the chest is rising and falling [1,2,3]	Listen and feel the breathing : none, shallow or gasping [1,2,3]	
CALL FOR HELP [1,2,3]	Fetch **First Aid Kit and defibrillator** (assistant 1)	**Contact Radio Medical** (assistant 2)	Coming **to the patient** to help (assistant 3)
EVACUATE	Move the patient if there is imminent danger. [1,2] Place the patient flat on the back on a hard surface. [1,2,3]		
EXPOSE	Remove clothing from the chest. [1,2]		
START CPR with 30 compressions	Give 30 compressions to the chest, between nipples. [1,2,3]	Press 5-6 centimetres down with the hands on top of each other with outstretched hands. [1,2]	Press with a frequency of 100 to 120 bpm. (Rythm of Staying Alive) [1,2]
COUNT OUT LOUD			
CONTINUE CPR with 2 inflations	Give 2 deep inflations mouth-to-mouth [1,2,3]	Pinch the patient's nose and tilt the head back and lift up the chin. [1,2]	See if the chest rises - air is going where it should. [1,2]
CONTINUE NONSTOP CPR 30:2 UNTILL DEFIBRILLATOR IS ATTACHED			
FIRST AID KIT ARRIVES	Insert an oral airway tube if possible. [1,2]	Give the air with the ventilation bag: frequency 10 times per minute. [1,2]	Hold the mask and jaw with one hand to make a tight and tilt head backwards. [1,2]
	Turn on the defribrillator and follow its instructions. [1,2,3]	Attach the electrodes as shown on the defibrillator and press and massage them well into place. [1,2,3]	In case of a lot hair on the chest where the electrodes should be placed, remove the hair with a razor. [1,2]
DEFIBRILLATOR WILL ANALYZE THE RHYTHM			
SHOCKABLE (ventricular fibrillation / pulseless ventricular tachycardia)		**NON-SHOCKABLE** (pulseless electrical activity / asystole)	
PRESS THE BUTTON IF SHOCKABLE **DO NOT TOUCH THE PATIENT** **IMMEDIATELY RESUME CPR FOR 2 MINUTES. MINIMISE INTERRUPTIONS.**		**IMMEDIATELY RESUME CPR FOR 2 MINUTES. MINIMISE INTERRUPTIONS**	
Follow the instructions of the defibrillator. [1,2,3]		Follow the instructions of the defibrillator. [1,2,3]	
DURING CPR IF POSSIBLE			
Prepare to insert an intravenous needle for medical treatment according to instructions from Radio Medical. [1,2,3]		Only if there is 3 or more people to take care of the patient. [3]	
When there are signs of life Follow **ABCDE** [1,2,3]		Continue CPR until medical personel arrives to the vessel, or Radio Medical tells to stop. [1]	

[1] [2] [3]

2.1 Defibrillator & CPR

Remember to change parts because the one doing the CPR will get tired surprisingly quick.

DEFIBRILLATOR & CPR (video)

-When arriving to an unconscious patient,

- Try waking them up, by ex. Shaking their shoulders
- If they don't wake up, check if they are breathing
- Call for help, either radio or screaming
- Start CPR with 30 compressions followed by 2 rescue breaths
- Always count out loud

- When help arrives, remove any clothing from the chest
- Turn on the defibrillator,
- It will give clear instructions,
    - "Call help now"
    - "Remove all clothing from patient's chest"
    - "Pull red handle to open bag"
    - "Look at pictures on pads"
    - "Peel one pad off blue plastic"
    - "Apply pad on bare skin, exactly as shown in the picture"
    - "Press pad firmly"
    - "Peel other pad off blue plastic"
    - "Apply pad on bare skin, exactly as shown in the picture"
    - "Do Not Touch Patient"
    - "Evaluating heart rhythm"
    - "Stand by, preparing to chock"
    - "Everyone clear, press flashing button"
- Once you've pressed it
    - "Shock delivered"
    - "Provide chest compressions and rescue breath"

-At this point the second person starts preparing the intubation.

- And the other one continues with the compressions

3 Other medical procedures with videos

3.1 Catheterization

If the bladder does not drain normally and urinary retention develops, the bladder must be emptied by catheterization. Absolute cleanliness should be observed during catheterization as it may increase the risk of urinary tract infection. Always consult your doctor about the need for catheterization.

CATHETERIZATION (video)

- Before putting on gloves open all the packages,
- Start with placing a protective sheet under the penis
- Pour a semi large amount of the cleansing liquid onto the sponges
- Put on the gloves
- Place the urinal under the penis
- Take a firm grip
- Start by cleaning the penis properly, use all the sponges you've got.
- Break the cap of the local anaesthetic
- Empty the whole anaesthetic in the penis through the tip
- After that take the catheter tube
- Stick it in the penis whilst tweezing the tip of the tube so the liquid can't come out yet
- Make sure the urinal is properly under the penis when you release the liquids flow
- Once the bladder is emptied, pull out the catheter

3.2 Stitches

Even though the vessel as environment isn't sterile, do your best to ensure that your hands and instruments are as sterile as possible. Wash your hands before starting, use gloves and change gloves if they are contaminated, sterilize instruments and keep the wound clean.

PREPARING STITCHES (video)

- Put on glows
- Next you place the surgical drape on the area that needs to be stitched,
- Prepare the needle and the syringe for the anaesthetic
- Onboard the ship there is, lidocaine 10ml/mg, the total amount should not be over 20ml.
- Anaesthetize the edges of the wound. Let the anaesthetic take effect, 10 minutes.
- Remove the needle carefully from its package
- Clean the wound again with the antiseptic before starting stitching

STITCHES (video)

Grab the needle at the end of the needle with the needle holder,

Use the surgical forceps to hold the edge of the wound when stitching

Begin by pushing the needle with the needle holder at a right angle though the skin at the edge of the wound

When pushing turn the needle so that the tip comes out through the skin on the other side of the wound.

Push the needle far enough so that you don't have to grab the needle tip, it is fragile.

Pull the thread leaving about 3cm on the starting point, place the forceps aligned with the cut

grab the long part of the thread with your other hand

wrap the longer thread around the forceps two times,

turn in 90 degree angle and grab the short end of the thread with the forceps and

pull so that the wounds edges only just touch each other and so that there is a knot above the wound.

Align the forceps with the cut again, wrap the longer thread around the wound once, turn grab and pull.

Repeat a third time, wrap the thread twice around the forceps, turn grab and pull

Cut the thread leaving about 1cm.

Next stitch should be placed about 1-1.5cm apart.

When ready, cover the wound with sterile gauze dressing and secure it with surgical tape.

REMOVING STITCHES (video)

you need gloves, tweezers and stitch cutter or scissors

Stitches can be removed after 5-10 days.

If there is for example 5 stitches start with the 2nd, then the 4th, 1st, 3rd and 5th

Grab the knot with the tweezers

Cut the stitch with the cutter as close to the edge as possible

So that you don't have to pull the dirty thread through the skin.

4 Works cited

[1] P. Miilunpalo ja H. Lindfors, Laivasairaanhoidon käsikirja, Helsinki: Kustannus Oy Duodecim, 2019.

[2] SEAHEALTH Denmark/Søfartens Arbejdsmiljøråd, Medical guide for seafarers, Rødovere: SEAHEALTH, 2016.

[3] S. Naarajärvi ja T. Telkki, Ensiauttajan taskuopas, Helsinki: SPEK Suomen Pelastusalan Keskusjärjestö, 2016.