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(Article begins on next page)



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# MIGRANT DEATHS AND THE KATER RADEZ I WRECK: FROM RECOVERY OF THE RELICT TO MARINE TAPHONOMIC FINDINGS AND IDENTIFICATION OF THE VICTIMS.

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## Abstract

On March 1997, during a naval blockade imposed by Italy to prevent illegal immigration, the motorboat *Kater Radez I* full of Albanian refugees clashed with an Italian warship with 120 people approximately on board. The boat sank quickly after the collision just in the middle of the Otranto Canal (Mediterranean Sea). Only 34 individuals survived the accident, 58 died, mostly women and children, dozens were missing. After seven months spent at depth of 800 meters approximately underwater to constant temperature of 4°C, the motorboat was rescued and totally 52 bodies were recovered from the holds. The management of the mass disaster is summarized focusing on the procedures applied in the recovery of the boat and victims, and the identification process. The purpose of the article is to present the unique taphonomic model of decomposition dealing with marine sequestered environments. The post-mortem changes have been revised according with a skeletonization scoring system. Surprisingly most of the victims were in good condition with soft tissues still present except at the head/neck region and the hands resulting in the body parts mostly pre-skeletonized. Closed compartments as well as heavy clothing in multiple layers protected the bodies from animal activity of large marine scavengers. Presumptive positive identification was obtained in 49 out of 52 bodies based on the correspondence between ante-mortem and post-mortem data. An additional purpose of the article is also to focus on the practice of coercive actions disproportionate to the risk of unauthorized entry criticized by several international organizations for migration and recently condemned by the European Court in Strasbourg.

**Keywords:** mass disaster, marine taphonomy, post-mortem interval, identification, human rights.

## 1. Introduction

The present article describes the management of a mass disaster occurred on 13 March, 1997 in the middle of the Otranto Canal (Mediterranean Sea). The *Kater Radez I*, a motorboat full of Albanian refugees trying to land clandestinely on the Southern Italian coast, clashed with a ship of the Italian Navy with 120 people approximately on board. The boat sank quickly after the collision. Only 34 people survived the accident, 58 died, most of them women and children, dozens were missing. All the practical procedures applied in the recovery of the boat and victims, the examination of the bodies and the identification process will be discussed in details, focusing on the limits and advantages. The purpose is to present the unique taphonomic model of decomposition and post-mortem (PM) changes dealing with 52 bodies recovered from the holds of the boat after seven months underwater. Other 4 cadavers were recovered soon after the collision and 2 additional bodies during the recovery of the *Kater Radez I* relict after four months underwater but all these six corps were not examined by the Authors.

The event is also known as the tragedy of Otranto and it will be presented after 15 years as a warning to other Countries still applying migrant interception by warships. In fact, the Italian practice of intercepting boats full of migrants on the high seas and pushing them back without the required screening has been recently condemned by the European Court of Human Rights in Strasbourg (ECHR judgement n° 27765/09 of 23<sup>rd</sup> February 2012 in the case *Hirsi Jamaa and Others against Italy*). In this case occurred in 2009 on the high seas 35 miles from Lybia, the Court argued that such collective expulsion constitutes a violation of Article 3 (torture and inhuman treatment) of the European Convention on Human Rights [1].

## 2. The Historical background and the Kater Radez I sinking

The early 1990s brought the collapse of Communism in Balkans area followed by a period of political and economic instability and tragic events, especially in Albania. Early migration resulted the landing clandestinely of hundreds of Albanian refugees into Southern Italian coast travelled by ship or boat. In 1997 the crisis erupted and the economy collapsed. Thousands of Albanians tried again to cross the Adriatic sea at the Strait of Otranto seeking refuge in Italy. On March 1997 Italy declared a national state of emergency as a flood of Albanian refugees has swelled to more than 10.000 in less than a week. The Italian Navy was ordered to patrol the marine border and dissuade the refugees in crossing the approximately 50 nautical miles of the Otranto Canal and to prevent disembarking on national territory. On March 13, 1997, at 9.00 p.m., a motorboat full of Albanian refugees, estimated to have carried on board approximately more than one hundred boatpeople, sank following a collision with the Italian Naval corvette *Sibilla* that was patrolling along Italian sea-frontiers, just in the middle of the Strait of Otranto. While the Italian warship was attempting to stop the boat 35 nautical miles off the Italian coast, in international waters, the Albanian boat was struck broadside and sank quickly within 10-15 minutes approximately after the collision.

Several people standing on deck fell into the sea and some were saved but others drowned. 34 people were rescued immediately, most of them were men while their relatives, women and children were inside the four holds of the motorboat. All passengers in the holds died as the boat was rapidly engulfed and sank with final settlement on the sea-bottom of the Otranto Canal. Only four bodies (one male and 3 females) were recovered soon after the collision but the exact number of the victims was unknown since there was no official list of passengers. The survivors were taken on board to the port of Brindisi (Italian city on the Adriatic coast) and then taken away to an immigration center for identification. Albanian survivors accused Italian warship of intentionally ramming the refugee's craft. Italian authorities said that Albanian boat's captain rammed the warship while trying to evade its attempts to turn it back to Albania. Tensions arose between Italy and Albania. The Italian Government was indeed requested to pay a compensation to the families of each victim. Albanian officials claimed that approximately 84 people were missing.

### 3. The Recovery of the Kater Radez I wreck and working facilities

The task of recovering the wreck and establishing the dynamics of the event was assigned to a marine engineering company. The search for the sunken boat started and the Kater Radez I relict was located lying on sandy and muddy sea floor at depth of 800m approximately with the help of a Sub-marine Remotely Operated Vehicle (SROT). At that depth it was not possible to use divers for the recovery of the bodies although recommended [2]. During the search operations, after four months from the sinking, two additional bodies were found by SROT. They were completely skeletonized: one was found pretty close to the ship on the sea floor and, the second one at the entrance of the after hold (stern). The absence of soft tissues was explained by the effect of the strong underwater currents encountered and activity of marine animal life. In fact, several crustaceans, some shrimps and few small fishes were reported close to the relict. No other bodies were found outside the boat since most of the victims were still entrapped within the four holds. Therefore, the engineers decided to move the boat from a depth of 800m into shallower waters so that the missing bodies could be recovered and identified. A yellow sub-marine module was specifically designed for this purpose. After seven months later the tragic event, the boat was finally lifted off from the sea floor and gradually raised to surface. During the slowly transit to shallower waters, all hatchways were closed by the SROT to keep the fragile bodies inside the holds taking into consideration the potential for detachment or missing of body parts and other identifiable features [2].

On 18<sup>th</sup> October 1997, finally the boat was rescued from the bottom of the Adriatic sea and began its transit to the port of Brindisi (**Fig.1**). During the navigation to Italy, the ship was kept partially submerged and the water was gradually emptied out. Such procedure had been suggested to delay decomposition of the bodies after emersion. A Mass Disaster Team (MDT) composed by four forensic pathologists, two forensic anthropologists, one forensic odontologist, two autopsy technicians, one computer expert, and one photo-reporter was appointed out for the identification (ID) procedures. Therefore, it was established to follow the standards for disaster management recommended by Interpol DVI Guide (already published in 1984, revised just in 1997 and last updated in 2008, available for download from the Interpol website – <http://www.interpol.int>). During the rescue operation the MDT designed and made ready a prefabricated building to house the mortuary facilities. The morgue was located on a wharf in the port of Brindisi, final destination of the Kater Radez I relict. The mortuary included a large refrigerator space for body storage (up to more than 100 cadavers), 3 autopsy tables, an x-rays facility, computer workstations and offices, toilets and shower-baths. Close to the morgue, a forensic anthropology and odontology laboratory was specially equipped for the treatment and analysis of expected human skeletal remains or body parts. An headquarter space divided the operations area from a meeting area for family assistance center and conference press. An additional work-station was also equipped to wash and dry all personal belongings (documents, clothing and foot wear, jewellery, etc.) found on the bodies or recovered in the luggages. All fluids flowed into a large cistern through a water-pipe network. Several days before the arrival of the Albanian boat into the port of Brindisi, it was possible to inspect a similar vessel sequestered by Italian Navy some months before, to plan the access into the holds and the recovery of the cadavers.

### 4. Ante-mortem (AM) data collection

During the recovery and transfer operations of the sunken boat, AM data were collected from the relatives. Face-to-face interviews were conducted directly by MDT members with the assistance of police investigators and interpreters. According with the standardized ID procedure recommended by Interpol DVI Guide [3], all AM data were entered in an appropriate software and stored on ID case files for the secondary matching against PM findings. To this purpose Interpol DVI AM and PM forms (available for download from the Interpol website – <http://www.interpol.int>) were largely summarized in a

bidirectional module applied also as checklist. The modules computerized enabled ID review and verification through one-to-many search capabilities based on multiple criteria. At the end of the AM data collection, 84 files were filled. It was clear since the beginning that the ID was not an easy task as for most of the victims there were no dental or medical records. No original radiographs or DNA samples useful for comparison were also provided. For several cases not even photographs were available for comparison but only a silhouette sketch. Although there was considerable pressure to expedite the ID process, DNA was not routinely employed because of at that time there was no National DVI team equipped for this task and DNA analysis was considered time consuming and too expansive by the Judicial Authority. Therefore, it was decided to apply all the key markers available for ID even though not the most efficient like DNA [4]. For these reasons secondary means of ID were mostly used among which personal description and clothing. During data collection, information concerning individual features (scars, fractures, tattoos, dental status, etc.), personal effects (particularly type and model of clock wrists, rings, ear-rings and other jewellery), clothing (design, color and manufacturing brand) and the victim's position on the boat (fore, central or after holds, engine or steering compartments) were stressed because expected of great value in the presumptive ID as in other mass disaster [5]. Even if there were no official AM dental or x-rays records, a general description of dental defects or presumptive location of dental restorations were asked to the families. At the interviews, the MDT was really surprised in knowing that most of the victims were dressing in layers. The reason for doing that it was not only to keep warm (since the collision occurred in winter) but also to save room enough for other refugees in the holds. In fact, all the passengers were strongly invited from the Albanian crew to carry on only hand-luggage or small hand-bags since there were not so much space for everybody within the boat.

## 5. The recovery of the bodies and state of preservation

Once the ship arrived at Brindisi, the recovery of bodies began. A structured and systematic approach to victim recovery was designed in order to prevent the potential disarticulation/detachment of the head or lower jaw, limbs and other body parts [2]. Two forensic pathologists were directly involved in the handling, bagging and securing the dead bodies along with police officers and a fire department squad. In three days, from 21 to 23 October 1997, totally 52 bodies (28 females, 24 males) were recovered from the holds as follows: 1 from the engine compartment, 8 from the steering compartment (**Fig. 2**), 9 from the fore hold, 10 from the central hold, 24 from the after hold. No partial set of remains was found except several anterior teeth missing PM and disarticulated hand bones. All bodies exhibited varying degrees of decomposition and partial skeletonization related to prolonged submersion in marine environment and activity of animal aquatic life. Some marine scavengers were found within the boat and mainly represented by living gastropod mollusks and crustaceans like white deep sea crabs. Among the mollusks, in particular, specimens of *Adula simpsoni* (Marshall) and *Xylophaga dorsalis* (Turton) were identified. Each body was labeled progressively according to the finding-site and put in a body-bag. Baggage recovery and sifting of all the materials found in each hold concluded the operations on board.

At the beginning of morgue operations, the body was scanned by fluoroscopy but no fractures consistent with fatal blunt trauma were observed. All the bodies were then photographed before and after removal of clothing. It was confirmed that most of the victims were dressing in multiple layers with heavy clothing. Heads and hands were the only body parts mostly uncovered. Bodies were externally examined with the aid of a check-list including accurate description of the clothing and a standard dental chart. In most of the bodies the skin and subcutaneous tissues had a somewhat unctuous, waxy consistency. Initial adipocere formation (soft with a greasy consistency) appeared on most covered areas of the bodies explaining the preservation of body tissues. No relevant traumatic injuries were observed and, therefore, it was quite clear that all the victims shared the same cause of death (drowning). Anthropological data including sex, and body measures (weight and height) were recorded. At physical inspection, sex determination was quite easy since external genitalia were

well preserved in all bodies. That was a great surprise. In fact, based on the long PM interval (seven months already passed submerged at the sea floor) and based on the previous SROT survey documenting two skeletonized bodies, the MDT expected to see pre-skeletonized bodies or skeletonization for most of the victims. At that time, there were not so many previous case reports useful for taphonomic comparison dealing with bodies recovery from sunken boats. Worth of mentioning the 15 victims recovered at different times from the Belgian flag cargo ship *Mineral Dampier*, sank in the East China Sea on June 1995 [6]. In this case three corpses found in a open cabin 433 days after the disaster were skeletonized with very few remnant of adipoceric tissue while the other 12 cadavers showed different stages of decomposition from early to advanced. In an additional posthumous case, 7 sets of intact remains, along with an eight set of partial remains, were recovered after 9 months approximately immersed on the ocean floor at a depth of 600 meters, from the holds of a Japanese boat sank on February 2001 [7].

In the Otranto Canal the environmental conditions at depth of 800m were the following: temperature 4°C, pressure 81 atmospheres, salinity 35%, oxygen 0.5ml/l, current running from north-east to south-west (velocity: 10-15c/sec). Since all the victims shared the same environmental conditions, a semi-quantitative evaluation of skeletonization was applied on patterns of bone exposure and body part loss according to Haglund [8]. Therefore, each body was classified based on state of preservation and PM changes. It was decided to score the human remains for regional presence of soft tissue, exposure of bone, and disarticulation to determine the general decomposition pattern of bodies recovered from aquatic environment (**Tab. 1**). The regions scored were the head, neck, hands, forearms, upper arms, feet, legs, pelvic girdle and, trunk.

Some Authors have suggested the study of decomposition by using accumulated degree days (ADD) to estimate PM interval (PMI) and PM submersion interval (PMSI) [9-10], and regression equations have been also calculated. However, Authors [9] already warned on the effect of adipocere on the accuracy of their model because of delaying or halting the appearance of later decompositional characteristics. Therefore, it was decided not to score the process of decay by using a total aquatic decomposition score (TADS) according with descriptive decompositional scoring system for ADD prediction. In fact, in this case the PMI was known and all bodies were subjected to constant temperatures of 4°C for 210 days approximately (seven months) equating to 828 (ADD) totally considering 0°C as base temperature [11].

### 5.1. Marine taphonomy findings

The final scores assigned to the study group according with skeletonization scoring system (SSS) are illustrated in **Tab. 2**. With great surprise, most of the victims were in good condition with soft tissues still present as clearly shown by high frequency of score 0 for SSS. In particular, soft tissues were mostly complete especially at the upper arm, pelvic girdle and foot, those body parts covered by heavy clothing and foot wear. Partial or total exposure of bones due to loss of overlying soft tissue was observed mainly at the head/neck region as well as at the hands and wrist, those anatomical parts mostly exposed to environmental organisms. In our series maximum scores like 4 for SSS and 9 for DSS (related with absence of the anatomical region) were assigned only in two cases dealing with missing hand/wrist bones. Heavy clothing was able to inhibit the release of the few disarticulated bones (i.e. mandible, cervical vertebrae, phalanges and other hand bones still attached by ligaments and/or thinly tissue bridges) explaining why there were only a couple of missing body parts.

The pattern and sequence of decomposition observed in our series can be considered unusual for human remains in a marine context for several months but mainly related to submersion of the fully clothed bodies inside a sequestered environments like the holds of the relict. In fact, such closed compartments as well as heavy clothing in multiple layers protected the bodies from animal activity of large marine scavengers but not from small fishes, crustaceans and mollusks. Compared with the two skeletonized bodies found outside the boat by SROT after 4 months, all 52 bodies recovered after 7

months from the sequestered environments were in good state of preservation showing advanced pre-skeletonization only in particular anatomical regions (such as head/neck and hands) unprotected by clothing (**Fig. 3**).

Such PM findings are consistent with previous reports concerning forensic taphonomy in marine contexts [12-13]. They inform us that human remains submerged in aquatic environment tend to lose soft tissue primarily at the hands and the facial area because of the thin tissue overlay [14]. The general pattern of soft tissue loss can be the effect of a wide spectrum of environmental factors among which temperatures, depths, and currents [8]. For example, using animal model [15], a pig carcass was found mostly skeletonized 135 days after submersion at depth of 99 meters on the ocean floor but tissue loss was slower compared with carcasses sunken in shallower water. In fact, in marine environment more than in terrestrial environment, immersed bodies can be attacked by a wide variety of animal scavengers [12-13]. Based on the research study on pig models in the marine environment, Anderson [15] observed that most invertebrate fauna are opportunistic scavengers and fed on the remains at all times so that no classic succession of invertebrate species can be determined (in contrast with insect colonization in terrestrial environments). No species have been found to be carrion dependent but the feeding patterns can better explain some PM findings such as those observed in the victims of Kater Radez I. Based on human and animal models [8, 14-16] especially the open body orifices on the face (nose, mouth, ears) seem to be easier defleshed by marine organisms. Previous Authors already noted the preference of crabs for facial flesh and eyes as they large chelate claws can tear open the skin and rapidly deflesh a body [13]. The depredation by small fishes has been also observed primarily on exposed fingers and along the lips and ears as small erosions of the tissue [12].

In our series, the head, the neck and the hands were the body parts mostly skeletonized with hand-bones being disarticulated in only 2 cases. The mechanism of soft tissue destruction in the skeletonized areas was mainly the result of the feeding activity of marine scavengers such as small size fish, deep sea crabs and mollusks. Clusters of *Xylophaga dorsalis* (Turton) were also observed on clothing and wooden supports of the wreck as a substrate for attachment (**Fig. 4**). Circular PM defects depicting the shape of such marine bivalve mollusks were mainly observed on the skin of leg and trunk of several victims (**Fig. 5**). Among the PM changes a distinct pink coloration of the teeth was found in only 18 cadavers (13 females and 5 males) of ages ranging between 13 and 60 years, corresponding to the 34.6% of the sample [17]. The phenomenon was more pronounced in younger individuals due to age-related changes of the root canal, less penetrable by the pigment responsible for the PM pink staining. Based on such finding it was concluded that there is no obvious correlation between the occurrence of the pink teeth and the cause of death, but the condition of the surroundings (especially humidity) as well as body position must certainly play important roles in the development of the pink-tooth phenomenon.

## 6. Identification

Basic biological information were mostly available from physical inspection including sex determination and presumptive age estimation. However, forensic anthropologists and odontologists played an important role establishing biological age and identifying the decedents as expected [18-19]. Autopsy was performed only to verify some unusual or traumatic findings or in case of age undetermined. At autopsy, the internal organs were in place and showed nearly normal coloration but demonstrated extensive softening and autolysis. For age assessment some teeth and bones (i.e., mandible, clavicle, hands, some long bones) were taken for a more detailed osteological and dental analysis. For practical reasons, age assessment was performed according to age group mostly as several years later will be recommended [20]. It was not an easy task since several infants and children along with adults were found. Age assessment was performed by two forensic anthropologists and two forensic odontologists based on somatic, skeletal and dental maturity indicators. Dental examinations (including dental mineralization and eruption) were performed for each body in order to support also the ID process based on



restorations or gross dental features. The appearance of ossification centers, union of epiphysis and dimensions of bones were investigated by x-rays according with the time-table for the aging process. In this respect, skeletal indicators and dental charts were extremely useful in the assessment of the presumptive biological age [21]. Final biological age assessment by combined method (physical, dental and anthropological examinations) gave results pretty close to the chronological age of missing victims with not relevant margin of error (up to 2 years in sub-adults and to 10 years in adults). Distribution of bodies among their age range (**Fig. 6**) clearly shows that victims were mostly young with 43 individuals less than 35-years-old among which 24 children (15 males and 9 females) less than 15-years-old. The distribution of bodies recovered from the five compartments is summarized in **Tab. 3** demonstrating that most of the victims entrapped in the holds were young women and their children as the men were quite all on the main deck during navigation.

All data were recorded on the computerized bidirectional module resembling the Interpol DVI PM Form largely summarized. The comparison between PM and AM data for personal ID was supported by a dedicated software. Final ID was confirmed by a leader group consisting of a forensic pathologist, anthropologist and odontologist. During the working days there was a considerable pressure by Italian investigating authorities, survivors and family members of the victims, as well as national and international press for a rapid ID of such mass disaster. The original decision to use in the ID process all the biological and non-biological means available gave unexpected results. After 3 working days, presumptive positive ID was obtained in 49 out of 52 bodies mostly based on the correspondence between AM and PM data concerning clothing, personal belongings (jewellery in particular and documents) and dental records. The distribution of ID markers has shown on **Tab. 4**. It is quite interesting to note that in this case secondary key markers of ID (including personal description, medical findings as well as personal belongings and clothing), ordinarily not sufficient as a sole means of ID, supported the present ID process. This was possible because of some primary and most reliable means of ID (i.e fingerprint analysis, comparative dental and DNA analysis) were not possible to apply for all the sample or sometime not available [22].

At the end of morgue operations and ID process, the relatives were called and asked to check the previously selected personal belongings and clothing for identification. The clothing and personal belongings associated with each body were carefully collected and returned to the families in a box only in case of presumptive positive ID. Only 3 bodies were not identified because there was no correspondence between PM and AM data available: a male 4-5 years old, a male 13-14 years old, a female 40 years old approximately. Based on the enormous potential of DNA analysis in mass fatality DNA samples (a molar tooth) were taken from each victims among which even the three unidentified bodies according with standards and guidelines for forensic genetics widely recommended [4].

In a similar event concerning the sinking of a Japanese fishing training boat [7] dental comparison was the sole and most efficient forensic method applied to identify the 8 victims recovered after 9 months immersed on the ocean floor at a depth of 600 meters approximately. In the Japanese tragedy AM dental records were available for quite all the bodies but this was not the case for the Albanian victims where several of them had not ever seen a dentist in recent years and even several PM dental charts were incomplete due to multiple teeth missing PM. However in our series positive ID was achieved totally in 42% of the sample (21 bodies out of 49) based on dental records (26.5%) and other biological features like scars or old fractures (16%). Based on these data, dental comparison still offers a rapid and cost effective approach in the ID process despite important advances in DNA technology.

However, when AM dental records are not available it can be crucial to consider the help of less efficient ID markers (see clothing, jewellery, personal belongings, etc.) especially in case of immigrants from poor countries. In such cases, people use to take care of their clothing since they are sometimes the only precious thing they really have. In the sinking of the M/S Estonia, one of the European most severe passenger ferry disaster [23] personal effects and clothing also provided identifying information in 48% and 45% of the sample respectively. The Finnish DVI team succeeded in a challenging task involving ID of 94 victims mostly Estonian and Swedish, recovered within 33days of the accident mostly based on dental information

(60%). However, the Finnish DVI team observed that while Swedish victims had full AM dental records useful for comparison (97%), there was a consistent lower rate of AM dental data among the Estonian victims (27%) which is quite the same rate found in the Albanian sample (26.5%).

## 7. Conclusion

After more than 8 years of proceedings, the captains of both ships were held responsible for *shipwreck and multiple manslaughter*. The Court of Brindisi convicted both the Italian and Albanian captains with the Italian one to 3 years in prison and the Albanian one to 4 years. Even if the event raised questions over the extent of power that every country may adopt to protect unauthorized entry, responsibility for the tragedy was attributed to both captains and thus relegated to the individual level, the result of a dangerous maneuvering which was disproportionate in relation to the purpose of stopping the motorboat full of refugees. But the law of the sea and human rights have developed interesting relationships [24]. In this regard, several other international organizations for migration raised arguments to limit coercive actions disproportionate to the risk of unauthorized entry. The United Nations High Commissioner for Refugees (UNHCR) has also criticized the naval blockade imposed by Italy even if it had been established through an intergovernmental bilateral agreement with the Countries from where the refugees were escaping.

Unfortunately, based on the recent condemn argued by the ECHR for a similar naval blockade occurred in 2009, it seems that Italy has not learned a lot from the previous Albanian lesson. As mentioned above, in a different and more recent international trial, Italy was condemned in 2012 by ECHR because of Italian border patrol ships did not offer any guarantee of treatment, according to international standards for asylum seekers and refugees exposing them to a forced repatriation to Lybia at risk of torture and ill-treatment [1]. In November 2000 the Italian government reached a friendly settlement with the Albanian applicants in the sum of one million lire (500.00 Euros approximately) by way of compensation for the deaths of their families. After 15 years, in 2012 the ECHR ordered the Italian government to pay 15.000 Euros approximately in damages to the 22 plaintiffs (two of whom have since drowned to cross again) [1].

The Kater Radez I relict has been recently turned into a special work of art to be placed in Otranto city. It will be a symbol of acceptance and solidarity between people and of all landings in Italy. The initiative has been supported by the UNHCR, the International Organization for Migration (IOM) and the Italian Committee for Refugees (CIR). There are no official data but UNHCR has calculated approximately 1.500 immigrants died while crossing the Mediterranean Sea to Europe in 2011 (data available from the UNHCR website - <http://www.unhcr.org> ). This is in memory of all migrant deaths at sea and a warning against the violation of the prohibition of collective expulsion.

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## *Tables*

**Tab. 1 - *Semi-quantitative evaluation of bone exposure modified from Haglund (1993) for human remains recovered from aquatic environments.***

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<b>0</b>	all soft tissues complete
<b>1</b>	partial exposure of bone due to loss of overlying soft tissue in some areas
<b>2</b>	total exposure of bone due to loss of all overlying soft tissue with articulations maintained by ligaments only
<b>3</b>	total exposure of retained bones with no articulation or partial loss of bones from a defined region
<b>4</b>	complete absence of the region (missing body part)

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**Tab. 2 - *Final scores of the semi-quantitative evaluation for the 52 bodies according with the skeletonization scoring system (SSD) provided by Haglund [1993].***

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Selected Regions	N	SCORES				
		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Cranium & mandible	52	3	20	24	5	-
Neck	52	11	23	11	7	-
Hand & wrist	52	7	14	19	10	2
Forearm	52	46	1	3	2	-
Upper arm	52	51	-	1	-	-
Foot	52	51	1	-	-	-
Leg	52	45	4	2	1	-
Pelvic girdle	52	52	-	-	-	-
Trunk	52	39	11	2	-	-

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**Tab.3 - Distribution of victims recovered from the holds of Kater Radez I.**

<b>Number of victims</b>	<b>Location</b>	<b>Sex</b>	<b>Age range</b>
1	engine compartment	1 M	28y
8	steering compartment	6 F 2 M	6 months - 33y 29 - 43y
9	fore hold	5 F 4 M	11 - 60y 18 months - 38y
10	central hold	5 F 5 M	21 - 49y 3 months - 15y
24	after hold	12 F 12 M	6 - 43y 5 weeks - 70y
<b>TOT: 52</b>		<b>28F – 24 M</b>	<b>5 weeks - 70y</b>

**Tab. 4 - Distribution of ID markers among the 49 victims.**

<b>ID markers</b>	<b>F</b>	<b>M</b>	<b>%</b>
clothing	26	23	100
jewellery	20	08	57
dental records	11	02	26.5
personal belongings	05	06	22.4
documents	02	06	16.3
scars, fractures, tattoos	03	05	16

## ***Figures***

**Fig. 1. A) *The Kater Radez I* relict found at the sea-bottom of the Otranto Canal by SROT.  
B) The relict rescued from the seabed by a yellow sub-marine module specifically designed**

**Fig. 2. *The bodies found in the steering compartment.***

**Fig. 3 – *The state of preservation observed in the bodies and scores according with Skeletonization Scoring System (SSD). A) A female 43 years-old with all soft tissues complete (score 0 according with SSD) except for some skin slippage at the head, limbs and feet.  
B) Total exposure of bones in body parts uncovered by clothing (head, neck, hands and wrist) in a female 8-years-old due to loss of overlying soft tissue with no articulation and/or partial loss of hand bones (score 3 and 4 according with SSD).***

**Fig. 4. – *Clusters of *Xylophaga dorsalis* (Turton) found on wooden parts of the relict.***

**Fig. 5 – *Post-mortem circular defects made by bivalve mollusca (*Xylophaga dorsalis*).***

**Fig. 6 - *Distribution of 52 bodies according to their age range.***

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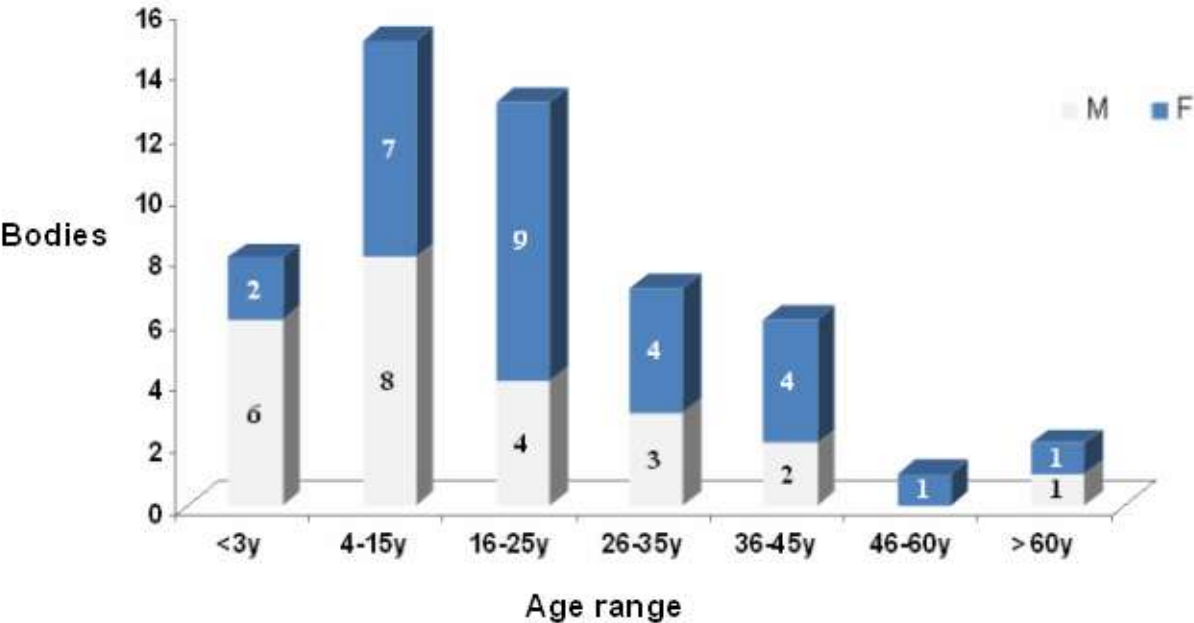
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**Fig. 5 – Post-mortem circular defects made by bivalve mollusca (*Xylophaga dorsalis*).**



**Fig. 6 - Distribution of 52 bodies according to their age range.**



Legend: F = females  
M = males