NATO STANDARD

AMedP-3.1

MILITARY FORENSIC DENTAL IDENTIFICATION

Edition A Version 1
DECEMBER 2014

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED MEDICAL PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

1 December 2014

1. The enclosed Allied Medical Publication AMedP-3.1, Edition A, Version 1, MILITARY FORENSIC DENTAL IDENTIFICATION, which has been approved by the nations in the Military Committee Medical Standardization Board is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2464.

2. AMedP-3.1, Edition A, Version 1 is effective upon receipt.

4. This publication shall be handled in accordance with C-M(2002)60.

Edvardas MAŽEIKIS
Major General, LTUAF
Director, NATO Standardization Office

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
General	CAN, DEU
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
CAN	While Canada agrees in principle that the team leader should be a national expert in Forensic Odontology (paragraph 6a), unfortunately Canada Forensic Odontologists are not qualified and therefore disagrees with paragraphs 6a. Canada also disagrees with the recommended size of the components of the Dental Identification Team. The minimal and maximal sizes should be larger (paragraph 7). Finally Canada disagrees with facial dissection being permitted without the approval of the lead Coroner, Medical Examiner or his/her representative (paragraph 23). If required in exceptional cases, facial dissection must be approved by the lead Corner, Medical Examiner or his/her representative.
DEU	DEU will implement the STANAG under the condition of unchanged investment of personnel and means.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	1-1
1.1	AIM	1-1
1.2	GENERAL	1-1
CHAPTER 2	DETAILS OF THE AGREEMENT	2-1
2.1	AGREEMENT	2-1
2.2	DEFINITIONS	2-2
2.3	IMPLEMENTATION	2-3
ANNEX A	MILITARY FORENSIC DENTAL IDENTIFICATION MANUAL	A-1
ANNEX B	FORENSIC DENTAL IDENTIFICATION EQUIPMENT LIST	B-1
ANNEX C	COMPARISON OF FDI AND UNIVERSAL NOMENCLATURE	C-1
ANNEX D	INTERNET LINKS TO INTERPOL	D-1
ANNEX E	DENTAL RECONCILIATION SHEET	E-1

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CHAPTER 1 INTRODUCTION

1.1. AIM

The aims of this Allied Medical Publication (AMedP) are to

- Outline an organizational structure for military dental forensic identification teams,
- Standardize equipment for the handling, examination, interpretation and presentation of dental evidence,
- Reiterate current internationally recognized protocols and procedures for identifying individuals from their oral remains, particularly in the Mass Disaster/ Mass Casualty scenario

and thus setting the inalienable basis for interoperability.

1.2. GENERAL

Experiences from the interaction of national dental identification teams in NATO deployment scenarios, multinational peace support operations, UN missions and international humanitarian aid missions have reinforced the need for standardization in the protocols and procedures of dental identification teams. These standards are the commonly accepted International Criminal Police Organization (ICPO; INTERPOL) DVI standards.

The proposal is a framework that enables available personnel to operate correctly in the described dental identification environment and may not require additional resources.

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CHAPTER 2 DETAILS OF THE AGREEMENT

2.1. AGREEMENT

Participating nations agree to:

a. Organize their dental identification teams in a way that they can undertake the protocols and procedures outlined in this AMedP (Annex A).

b. Equip their dental identification teams with the items listed in Annex B; this is a minimum equipment list and is not exhaustive.

c. Use the International Criminal Police Organization (ICPO; INTERPOL) dental identification documentation when operating in a multinational setting (Annexes C, D & E).

2.2. DEFINITIONS

DITL	Dental Identification Team Leader
ARS	Ante mortem Record Section
PES	Post mortem Examination Section
RPS	Radiography and Photographic Section
APCS	Ante mortem/Post mortem Comparison Section

2.3. IMPLEMENTATION

This AMedP is considered implemented when a nation has issued the necessary orders or instructions to the forces concerned, putting the principles and protocols of this agreement into effect.

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ANNEX A MILITARY FORENSIC DENTAL IDENTIFICATION MANUAL

A.1. INTRODUCTION

1. There are 3 accepted methods to derive definitive identification: Dental, Fingerprints and DNA. These methods of identification are complementary and circumstances will dictate when one or more of them are used. The key principle in any method of identification is the comparison of known with unknown.

2. Dental identification may be required in cases where dental evidence has been recovered from post-mortem remains. This may be in cases where there has been decomposition, fragmentation, incineration of the remains, or where teeth have been found post mortem.

3. Dental identification teams are responsible for the handling, examination, interpretation and presentation of all oral evidence from human remains.

4. The management of the dental evidence consists of the following procedures:

   a. Reconstruction of ante mortem data from the dental records of all suspected victims.

   b. Recovery, examination and compilation of all dental evidence from the post mortem remains.

   c. Comparison of the ante and post mortem records in order to ascertain whether identification is possible.

   d. Co-ordination and presentation of the findings to the Officer in Charge of the identification process to facilitate the issuing of death certificates.

A.2. ORGANIZATION AND COMMAND and CONTROL STRUCTURES OF THE DENTAL IDENTIFICATION TEAM

5. The military forensic dental team should be an integral part of the overarching military forensic support capability.

6. The Dental Identification Team (DIT) should comprise of:

   a. Dental Identification Team Leader (DITL). The team leader should be actively involved in forensic odontology and be recognized by the legal authorities of their national country as an expert. They should also have an affiliation with a major forensic dental association. The team leader will liaise

with those in command of the overall situation as well as with other forensic specialities, and will direct the dental identification team.

b. Ante mortem Record Section (ARS). This team should consist of a section leader with at least one additional member. The ARS will be responsible for the correlation of all ante mortem dental evidence and for the reconstruction of all ante mortem dental data using INTERPOL documentation.

c. Post mortem Examination Section (PES). This section should be organized into individual teams, each with two dentists to complete the post mortem examination and compile the dental evidence. There should be a section leader, who may be a member of one of the individual examination teams, who should be present at all times. The PES will be responsible for the recovery and documentation of all dental evidence from post mortem remains.

d. Radiography and Photographic Section (RPS). This section should be composed of a section leader and one other section member. However, due to the fact that dental identification is one part of a forensic capability, other members of the forensic support capability may undertake the function of this section. The DITL will co-ordinate the RPS if this is the case. The RPS will be responsible for undertaking and documenting all dental radiography and photography of the post mortem remains.

e. Ante mortem/Post mortem Comparison Section (APCS). The comparison section should be comprised of team members from both the ARS and PES. Where indicated in larger investigations, computer support staff may complement the section if identification software is being utilized. The DITL should head this section but it should also involve all section leaders. The APCS will undertake the dental comparison/reconciliation of the ante mortem and post mortem dental evidence to establish whether identification can be made.

7. The following table is a guide for the recommended composition of the dental identification team. Therefore, for fewer fatalities or in cases where the size of the DIT is curtailed due to operational or logistical reasons, personnel may be able to dual role within the team e.g. the DITL could also be part of the PES:

	Number of Fatalities		
	1-50	50-150	150-300
Dental Identification Team Leader (DITL)	1	1	1
Ante mortem Records Section (ARS)	2-3[1]	5	8
Post mortem Examination Section (PES)	2-4	4	6

[1] For incidents with over 15 fatalities, it is recommended that the ARS comprises of at least 3 personnel.

Radiographic and Photography Section (RPS)[2]	2	4	6
Ante mortem/Post mortem Comparison Section (APCS)[3]	3	6	7[4]
Dental Identification Team Numbers	Up to 15	Up to 20	Up to 28

The referred INTERPOL victim identification unit's composition is named similarly.

INTERPOL	**NATO**
Command	Dental Identification Team Leader
AM Team	Ante mortem Record Section
PM Team	Post mortem Examination Section
Reconciliation Team	Ante mortem/Post mortem Comparison Section

A.3. STANDARDIZATION OF PROTOCOLS

8. With a shift in emphasis in NATO doctrine towards joint and combined operations requiring a higher degree of flexibility and mobility, there is a need to ensure that all participants of this STANAG are standardized in their approach to dental identification. This enables multi-national co-operation if required within the operational area.

9. Charting. Ratifying countries agree to use the World Dental Federation (FDI) nomenclature and notation for charting of all dental data and evidence (Annex C). The same nomenclature must be used for both ante and post mortem data and evidence collection.

10. Documentation. Ratifying countries agree to use the dental ante mortem (yellow) and post mortem forms (pink) (Internet-links to most recent forms on INTERPOL-homepage see Annex D)

11. Charts should be charted in black ink. If an error is made during charting, either commence a new chart or initial all mistakes for legal purposes.

A.4. ANTE MORTEM DATA COLLECTION

12. The first essential requirement for the ARS is to obtain a working area specifically for the dental team. This area will become the identification center and will be where the compilation and correlation of the dental evidence should occur. A fax machine, telephone and an internet-linked computer should be sourced.

[2] Other members of the overarching forensic support capability may supply this function.
[3] Maybe comprised of members of the ARS and PES.
[4] For 50-300 fatalities, this number includes 2 computer support staff.

13. The section leader will liaise with the DITL to establish responsibility for the sourcing and collation of the dental records of those believed to be deceased. In the military environment, this task may be undertaken by the military police.

14. The ARS will catalogue and record all ante mortem dental records received in the identification center. From these records, members of this section will interpret this data and transpose it onto the INTERPOL ante-mortem forms, using the FDI notation.

15. The ARS is responsible for filing the following information in an organized manner:

a. Dental documentation requested.
b. Dental documentation received.
c. INTERPOL ante mortem charts.
d. Deceased identified.

16. As dental documentation is received for each suspected fatality, the ARS should record and receipt the documentation as well as noting exactly what has been received.

17. Each dental record should be transposed onto an INTERPOL ante mortem form and crosschecked by two individuals. All forms of dental information should be used to gain as much ante mortem data as possible. This includes dental documentation, radiographs, study casts, photographs, laboratory prescriptions and appliances. All information in the patient's dental documents regarding the status of each tooth should be recorded. Additionally any specific anomalies such as spacing, rotations, fractures, occlusion and positioning of teeth should be indicated, as should information on any orthodontic appliances/treatment or prostheses.

18. All radiographs should be viewed and the date of the most recent radiograph must be annotated on the ante mortem form. Any panoramic radiographs should also be included as ante mortem data. Any additional information should be added to the form. Only information that can be seen on the radiographs should be noted and under no circumstances should any assumptions be made. Section members should ensure that the radiographs have been viewed in the correct orientation particularly if viewing copies of radiographs.

A.5. POST MORTEM EXAMINATION

19. The post mortem section has the responsibility of examining and charting all dental post mortem remains. This work should be undertaken by two dentists working together to reduce the chance of errors. The first dentist should initially examine the remains whilst the second charts. They should then swap roles and repeat the

process. The PES is responsible for filing the INTERPOL Post mortem charts in an organized manner.

20. The order of the procedures within the morgue will usually be:

a. Recording and removal of clothing, jewelry and personal effects
b. Photography
c. External and internal post mortem examination incl. DNA-sampling
d. Dental post mortem examination incl. x-ray
e. Finger-, palm- and footprinting
f. Embalming.

21. These events may vary according to circumstances but the same procedural protocol should be followed for each body in turn. It is easier to wait until the medical post mortem examination has been completed prior to undertaking the dental examination as access, irrigation, cleaning and exposure of the oral cavity may be more easily achieved.

22. Before commencing the dental examination, the body reference number and sex must be checked and entered on the INTERPOL post mortem chart.

23. Access should be made as minimally invasive as possible. If required, facial dissection should be undertaken using ‘the neck upward technique’ or the ‘scalp downwards’ techniques, taking care to minimize facial disfigurement. If members of the team are unfamiliar with facial dissection, they are to consult with the DITL or the pathologist. Care should be taken not to fracture the teeth when using any form of leverage to gain access to the oral cavity. Jaws should only be removed with the permission of the Coroner, Medical Examiner or his/her representative and must be immediately bagged and tagged with the body reference number.

24. The identification process starts with a thorough and careful examination of the oral cavity area followed by careful cleaning of the dental remains with a toothbrush and a cleaning agent (sodium hypochlorite/ hydrogen peroxide/alcohol). Incinerated teeth may be brittle; therefore they must be handled very carefully to avoid losing valuable information.

25. The post mortem chart should be compiled in a methodical and systematic manner paying meticulous attention to detail. Care must be taken to chart all tooth-colored restorations as these can be easily missed. Uses of acid etch or dye may

help identify composite restorations. Each stage should be checked and re-checked by both dentists. The dentists must remain objective and under no circumstances make any assumptions. Any tooth not seen in the oral cavity should be charted as ‘not present’. However, if a post mortem radiograph confirms that the tooth is present but unerupted, it should be charted as ‘unerupted’. If it is obvious that a tooth has been lost or avulsed post mortem, then this should be charted “missing post mortem”.

Never assume that loose teeth found in a body bag belong to the post mortem remains within it.

A.6. POST MORTEM EXAMINATION (RADIOGRAPHY AND PHOTOGRAPHY)

26. Dental radiography may be completed during the initial whole body radiography investigation or later on during the dental examination.

27. All radiography units should be placed to minimize radiation to the surrounding areas. Personnel should also wear their own dosimeters at all times. Adequate tables, chairs and electrical outlets will be required for radiography equipment. If using wet film techniques, an automatic processor, darkroom and fluid disposal facilities may be required.

28. Full mouth periapical radiographs and if possible, bitewings should be taken of the dental remains. To facilitate radiographic comparison, the radiographs should be taken in such an orientation to try and replicate the AM radiographic positioning. In most cases this will involve the use of aiming devices but in some cases, bisecting angle techniques may need to be utilised. Periapical radiographs should be exposed of edentulous areas or where teeth appear to be missing, fractured or avulsed. In some cases, where there is a lack of supporting tissues, a test radiograph may need to be undertaken to determine the appropriate exposure.

29. All radiographs must be developed and mounted in the radiology section in a methodical manner to ensure that there is not any confusion between different sets of films.

30. Ante-mortem photographs (showing the anterior teeth) are a valuable aid in identification especially if dental ante mortem radiographs are not available.

31. The coroner/medical examiner may use photographs to document other physical findings. If this is the case there will probably be a dedicated forensic photographer on site who may take any dental photographs. If this is not the case, then only the person nominated by the DITL as official photographer of the DIT should be allowed to photograph proceedings.

32. A digital or Polaroid camera with a macro lens/ring flash should be used. The following photographs should be taken:

a. Anterior view-maxilla and mandible.
b. Lateral view-right and left.
c. Occlusal view-maxilla and mandible (mirror shot).
d. Additional fragments such as individual teeth.
e. Any unusual findings.

A.7. ANTE MORTEM/POST MORTEM COMPARISON

33. The final part of the dental identification process is the comparison of ante mortem data and post mortem findings. This comparison is carried out by the APCS.

34. To facilitate efficient comparison, the organization of the ante mortem and post mortem records is of paramount importance. Both the ante mortem and post mortem records should be filed separately according to sex, and in the following sub-sections:

a. Unrestored dentitions.
b. Dentitions with routine restoration.
c. Dentitions with crown and bridgework.
d. Dentitions with dentures.
e. Dentitions with implants.

35. Each ante mortem record is compared with the records in the most likely post-mortem sub-sections. For example, a missing person with crown and bridgework is checked against the post mortem records of the same sex in the post-mortem crown and bridgework section. After a comparison of the dental evidence, a second team member reviews the information. Any points of concordance between the ante and post mortem evidence are noted, discrepancies are resolved and a conclusion is reached on the category of identification.

36. Identification may fall into one of the following categories:

a. Positive Identification. The ante mortem and post mortem data match in sufficient detail quantitatively and qualitatively to establish that they are from the same individual. There are no irreconcilable discrepancies.

b. Possible Identification. The ante mortem and post mortem data have consistent features but due to either the condition of the remains or the quality of ante mortem data, a positive identification is not possible.

c. Insufficient Evidence. There is insufficient dental information to deduce any conclusions.

d. Exclusion. The ante mortem and post-mortem data are inconsistent.

37. The category of identification is reviewed and confirmed by the DITL. The identification will, at times, hinge on a minimal amount of dental evidence and the judgment of the examiners, along with consensus opinion on the category of the identification is more important than the total number of points of concordance.

38. For all positive identifications, the ante mortem and post mortem records are stapled together along with a statement of positive identification (Annex E). These documents should then be filed in alphabetical order in the positive identification section of the filing system with the surname of the deceased underlined.

39. Computer comparison systems may be utilized where there are substantial numbers of remains. It will be the choice of the lead nation as to which program is chosen, with “DVI System International” by Plass Data® is being the recommendation by INTERPOL. The basic principle is that ante mortem and post mortem databases are built using the information charted on the INTERPOL forms. These two databases are then run against each other and the possibilities of matches are ranked. A decision should be made in the initial stages of the investigation whether computer comparison will be utilized, as this will dictate if computer codes will need to be annotated on the INTERPOL forms.

40. In larger investigations, the DIT may be complemented by personnel in order to undertake the computer comparison. Therefore, it is essential that these personnel have been adequately trained in using the chosen software system.

41. Computer comparison will eliminate a considerable amount of manual checking, producing lists of most likely matches in order of probability. However, the computer does not carry out the identification; it only reduces the number of records to be compared. The APCS and the DITL must still physically compare the evidence and ascertain an identification category.

ANNEX B FORENSIC DENTAL IDENTIFICATION EQUIPMENT LIST

EQUIPMENT	QUANTITY
Aprons, surgical, disposable	20
Gowns, surgical, disposable (long with cuffs)	20
Hats, surgical, disposable	20
Boots, rubber boots, Wellington type (3 sizes 2 of each)	6 pairs
Eye protection (facial shield)	20
Facemasks, disposable (several sizes)	100
Gloves, rubber disposable (several sizes)	200
Box, transportable (for instruments)	1
Cassettes, light-alloy metal, for scalpel handles, mirrors, probes)	4
Pen /fiber optic light (with spare bulb/batteries)	3
Headlight (with spare bulbs and batteries)	3
Scalpel Handle no 4	3
Blades no 20	50
Scissors, straight	2
Scissors, curved pointed	2
Haemostats, straight	2
Haemostats, curved	2
Handles mouth mirror	4
Mouth mirrors	6
Dental probes	6
Bite blocks	3
Hennings Plaster Spreader or other instrument for open jaws	3
Skull key	1
Magnifying Glass / Loupes	1
Ruler	1
Right-Angle Scale for photographs	1
Clipboards	3
Pens	4
Pencils	10
Markers (permanent)	6
Notebooks	3
Ante mortem forms	100
Post mortem forms	100
Dental Reconciliation Sheet	100
Toothbrushes	12
Tongue Depressors (box)	1
Gauze pads (box)	1
Cotton Wool Rolls	1
Alcohol wipes (box)	1
Bags, plastic, zip-lock small	24

EQUIPMENT	QUANTITY
Bags, plastic, zip-lock large	24
Portable dental x-ray unit [5]	1
X-Ray films	80
X-Ray film mounts	80
Impression trays	1 set
Spatula	1
Mixing bowl	1
Plaster of Paris	1 kg
Bowl, clinical kidney shaped	2
Sodium hypochlorite solution	500 ml
Alcohol spray	3
Digital Camera	1
Digital Camera Memory cards spare	3
Photograph cheek retractors	1 set
Photograph intraoral mirrors	1 set
Acid Etch	1 bottle
10 m surge protected extension cord	1
Laptop Computer with: Current version of MS Windows ® Current version of MS Office ® “DVI System International” by Plass Data ®	1

[5] analogue or - due to interoperability with “DVI System International” - preferably digital

ANNEX C COMPARISON OF FDI AND UNIVERSAL NOMENCLATURE

The existing registration numbers are very close and the confusion with a double registration codification could decrease the reliability in case of identification. Therefore, the transition boards will be of assistance to those practitioners who are not familiar with the FDI nomenclature.

1. Permanent Teeth

FDI (Two-Digit Notation):

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

UNIVERSAL:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	45	16
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

2. Deciduous Teeth

FDI (Two-Digit Notation):

55	54	53	52	51	61	62	63	64	65
85	84	83	82	81	71	72	73	74	75

UNIVERSAL:

A	B	C	D	E	F	G	H	I	J
T	S	R	Q	P	O	N	M	L	K

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ANNEX D INTERNET LINKS TO INTERPOL

Link to Ante Mortem form – Sections F1 and F2:

http://www.interpol.int/content/download/10804/76858/version/11/file/AMForm.pdf

Link to Post Mortem form – Sections F1 and F2:

http://www.interpol.int/content/download/10801/76833/version/10/file/PMForm.pdf

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ANNEX E DENTAL RECONCILIATION SHEET

Disaster:	Date:		
PM Number: Height:	AM Number: Name: Age: Height:		
Tooth	**PM Findings**	**AM Findings**	Tooth	Score*
18			18	
17			17	
16			16	
15			15	
14			14	
13			13	
12			12	
11			11	
21			21	
22			22	
23			23	
24			24	
25			25	
26			26	
27			27	
28			28	
38			38	
37			37	
36			36	
35			35	
34			34	
33			33	
32			32	
31			31	
41			41	
42			42	
43			43	
44			44	
45			45	
46			46	
47			47	
48			48	

* Score: X = elimination - = uncertain 0 = identification

Conclusion:					
Identity: ☐ established	☐ probable	☐ possible	☐ insufficient evidence	☐ excluded	

Date:	Name:	Signature:	Date:	Name:	Signature:

AMedP-3.1(A)(1)