NATO STANDARD

AMedP-3.1

MILITARY FORENSIC DENTAL IDENTIFICATION

Edition B Version 1

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NATO LETTER OF PROMULGATION

15 July 2020

- The enclosed Allied Medical Publication AMedP-3.1, Edition B, Version 1, MILITARY FORENSIC DENTAL IDENTIFICATION, 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.
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> Dieter Schmaglowski Deputy Director NSO Zoltán GULYÁS Branch Head P&C

Brigadier General, HUNAF

Director, NATO Standardization Office



RESERVED FOR NATIONAL LETTER OF PROMULGATION

II

RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS

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.

RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
BEL	BEL is not able to deploy an independent dental identification capability but can participate to an international identification team on a case by case basis.
LTU	Recently deoxyribonucleic acid (DNA) testing methods are used. Panoramic dental X-ray images of the servicemen of LAF are made before deployments.

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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CHAPTER 1 – INTRODUCTION

1.1. AIM

The aim of this Allied Medical Publication (AMedP) is to:

- define the ante-mortem, post-mortem and reconciliation processes regarding the handling, examination, interpretation and presentation of dental evidence;
- outline the operational and scientific background concerning the above processes; and
- reiterate current internationally recognized protocols and procedures for identifying individuals by their oral remains.

This will set the inalienable basis for interoperability in the deployed identificationscenario as well as for civil-military cooperation in multinational mass disaster-victimidentification scenarios.

1.2. GENERAL

- a. Constant global social and political changes require militaries to focus both on their deployed role and on the tasks required to build internal national resilience.
- Each NATO member country needs to be resilient to resist and recover from a major shock such as a natural disaster, failure of critical infrastructure or an armed attack.
- c. Resilience is a society's ability to resist and recover easily and quickly from such shocks and combines both civil preparedness and military capacity. Robust resilience and civil preparedness in allied countries are essential to NATO's collective security and defense.
- d. Disasters and attacks rarely have a singular national impact and frequently involve citizens from multiple nations.
- e. Nations whose citizens have become victims of a disaster have a joint responsibility for the ethical, transparent and humane treatment of all victims. Nevertheless, it is the authorities of the country where the disaster has occurred who have the chief responsibility of managing the victims.
- f. The collective experiences of dental officers serving in NATO deployed scenarios, multinational peace support operations, United Nations missions and international humanitarian aid missions, as well as through cooperation in various

national DVI scenarios, highlights the need for standardization of protocols, procedures and tasks where dental officers are involved in any forensic identification scenario with multinational fatalities.

- g. Following a mass fatality incident, effective partnerships between nations and proficient civil-military interactions are paramount.
- h. Dental officers and other personnel must be able to support the identification tasks based on their expertise and their understanding of this standard.
- i. The proposal is a framework that enables available personnel to operate proficiently in a disaster victim environment, may not require additional resources, and will not supersede more strict national regulations.

CHAPTER 2 – DETAILS OF THE AGREEMENT

2.1. **DEFINITIONS**

a.	AM	ante-mortem
b.	DNA	deoxyribonucleic acid
C.	DO	dental officer
d.	DVI	disaster victim identification
e.	FDI	Fédération dentaire internationale – World Dental
		Federation
f.	friction ridge analysis	comparison, evaluation and verification of patterns
		from fingertips, palms, etc.
g.	identification	legal determination based on the scientific matching
		of information on missing persons with unidentified
		human remains
h.	INTERPOL	International Criminal Police Organization – ICPO
i.	ISO	International Standardization Organization
j.	PM	post-mortem
	reconciliation	comparison between AM and PM
k.	SLR camera	single lens reflex camera

2.2. AGREEMENT

Participating nations agree to:

- a. train DOs and other personnel to perform AM, PM and reconciliation tasks so that they are able to follow the procedures outlined in this AMedP to ensure a reproducible outcome admissible as evidence (Annex A, B, C);
- b. ensure DOs and other personnel can use forensic dental equipment appropriately and safely (Annex D); and
- c. use the INTERPOL dental identification documentation and ISO 3950 designation system (FDI notation) to chart of all dental data and evidence, when operating in multinational or civil-military scenarios. (Annex E, F).

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.

CHAPTER 3 – BACKGROUND

3.1. SCIENCE AND POLITICS

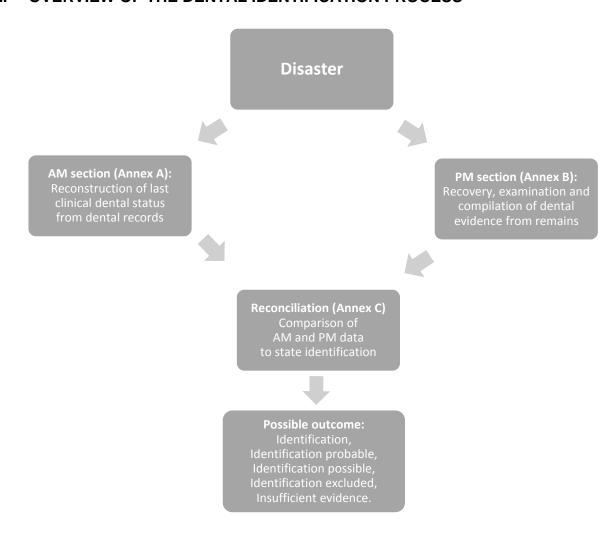
- a. It is internationally accepted that primary identifiers are the most reliable methods by which identification can be confirmed. These primary identifiers are friction ridge analysis, forensic odontology and DNA analysis. These methods of identification are complementary and circumstances will dictate when one or more of them are used to establish identity of unknown human remains. Each primary identifier can stand alone as the sole evidence to make a positive identification; however, all possible methods of identification should be used to identify human remains.
- b. The key principle in any method of identification is the comparison of the unknown with the known.
- c. The unique structures and traits of human teeth and jaws can be used in the identification process. Dental data recovered and recorded at the time of PM examination is compared to AM data recorded during their lifetime.
- d. The teeth are well protected in the oral cavity and are able to withstand many external influences at, near, or after the time of death. Teeth and restorations are often the last remaining primary identifiers.
- e. Dental treatment is unique to an individual and therefore conveys valuable information for identification purposes.
- f. In the absence of dental treatment, anatomical characteristics of the teeth and jaws can also provide useful data to support identification.
- g. Based on their professional knowledge and expertise in clinical treatment and diagnosis, DOs are uniquely placed to assume responsibility for the
 - handling,
 - examination,
 - interpretation and
 - presentation

of all oral evidence from human remains in the identification process.

- h. Dental evidence can lead to identification when the following procedures take place:
 - Reconstruction of AM data from dental and other available records.
 - Recovery, examination and compilation of all dental evidence from PM remains.
 - Comparison of the AM and PM records in order to ascertain whether identification is possible.

- Coordination and presentation of the findings to the person in charge of the identification process to facilitate the issuing of death certificates.
- i. Internationally, 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 follow a standardized approach to forensic dental identification. This enables multi-national cooperation within the operational area.
- j. Forensic dental identification is an essential aspect of the resilience a nation needs to recover from incidents such as a natural disaster, failure of critical infrastructure or armed attacks.
- k. These situations often require the close interaction between civilian and military capacities, and, as such, robust standardized operational procedures in the field of forensic dentistry field are essential.

3.2. OVERVIEW OF THE DENTAL IDENTIFICATION PROCESS



3.3. GENERAL INFORMATION:

- a. DOs need to be fully prepared in terms of general knowledge of the ID process.
- b. Securing the AM dental records is a crucial step in dental identification. The quality of these records is dependent on dental care providers keeping accurate records of the dental status of their patients. Meticulous evaluation of the original materials facilitates the creation of an accurate record of the status of the patient's mouth at the time of the last known dental visit. The AM forensic record should be recorded in a format that provides an accurate contemporaneous dental record. (Annex A)
- c. The goal of the PM dental examination is to locate, identify, and document anatomical structures, dental restorations, and dental appliances that will aid the comparison process. The more information documented in this examination, the greater the likelihood of successful comparison to an AM record. (Annex B)
- d. DOs must be competent in the use of forensic equipment. (Annex D) The equipment list is not mandatory or exhaustive but its use is recommended as it contains the most common equipment required to ensure a reproducible outcome. Nations will supply their own equipment and determine how they can achieve a thorough ID process and the required reproducible outcome.
- e. The reconciliation process will compare completed AM and PM records. Although this can be done manually for individual identifications, in multiple fatality incidents the use of digital data collation and comparison is recommended to ease the search and comparison of the AM and PM records and to ensure a reproducible outcome. (Annex C, G)

ANNEX A - ANTE-MORTEM PROCEDURES

Step 1	contact dental care providers of suspected fatality evaluate the dental records in order to get most recent overall picture of the clinical situation in the oral cavity at time of last recorded dental visit	 obtain dental documentation for each suspected fatality the quality of the AM dental records is critical to dental identification all forms of dental information should be used to gain as much AM data as possible under no circumstances should any assumptions be made the older the AM records, the higher the potential for inconsistencies file latest dental record using the ISO 3950 for designation of teeth and areas of the oral cavity use radiographs and other imaging available ensure that the radiographs have been viewed in the correct orientation particularly if viewing copies of radiographs
010	LA INTERPOLATIONS (- use models and casts of the dentition
Step 3	complete INTERPOL AM 600's form (Annex F) every available detail will be of use during comparison	 use available technology to facilitate data collation especially in large scale DVI scenarios INTERPOL recommends "DVI System International" by Plass Data® in the multinational and civmil setting use INTERPOL 600's form for AM documentation use ISO 3950 for charting in multinational and civ-mil setting use black ink when charting manually if an error is made during charting, either commence a new chart or initial all mistakes for legal purposes use the same dental charting nomenclature for both AM and PM data and evidence collection work in reverse chronological order and list every treatment that has been carried out since the last record was compiled add every cavity, restoration, crown, implant, lost tooth, etc. into the form record every detail concerning the status of each tooth document type and serial numbers of dental Implants document type and extension of dentures or orthodontic appliances follow documentation timeline carefully complete the document carefully, leave no empty boxes have a second DO double-check the documentation resolve any discrepancies in the chronology
Step 4	prepare and hand over the results to reconciliation	 ensure the AM section knows how to contact the PM and RECONCILIATION sections in case clarification is required
		- AM records without a body will not result in an identification

ANNEX B - POST-MORTEM PROCEDURES

Step 1	identify all dental remains as such	 dental PM examination is best done after the medical PM examination as access, irrigation, cleaning and exposure of the oral cavity may be more easily achieved where remains are heavily burned, DOs should take photographs, examine the teeth and take radiographs before the medical examination thorough examination is critical as there may only be one chance to get accurate PM dental information
Step 2	access to oral cavity should be as minimally invasive as possible	 try opening the mouth with the help of a spreader or similar tool if facial dissection and removal of jaws is required, the coroner, medical examiner or other official must grant permission bag and label every removed part of the body and must be kept with the body/other remains
Step 3	examine the present dental situation, personal safety measures are to be taken at all times	 two DOs will be working to reduce the chance of errors the first DO will perform the initial examination of the remains while the second charts the DOs then switch roles and repeat the process start with a thorough examination of the oral cavity area followed by careful cleaning of the dental remains with a toothbrush and a cleaning agent handle incinerated teeth with added caution as they may be brittle use dental mirror and equipment that helps to get a better view of the dental situation record all types of findings be sure to chart all tooth-colored restorations as these can be easily missed use of transillumination or ultraviolet LED illumination may help finding tooth-colored restorations made of composites use acid etch or dye to help identify tooth colored restorations made of composites chart any tooth not seen in the oral cavity chart any tooth that was clearly lost or avulsed PM never assume that loose teeth found in a body bag belong to the PM remains within it

Step 4	take photographs/images of the oral cavity/dental remains	appropriate photographs/images are requiredthe use of a digital (SLR) camera with a macro lens/ring flash is advised
Step 5	take radiographs/images of the oral cavity/dental remains	 the use of portable digital x-ray systems is recommended bite-wing radiographs must be taken whenever possible periapical radiographs of every tooth, alveoli and region in the jaws are mandatory
Step 6	complete INTERPOL PM 600's form (Annex F)	 use available technology in data collation as it will ease the process especially in large scale DVI scenarios "DVI System International" by Plass Data® is recommended by INTERPOL use ISO 3950 system for charting use black ink when charting manually if an error is made during charting, either commence a new chart or initial all mistakes for legal purposes the same nomenclature must be used for both AM and PM data and evidence collection record every detail concerning the status of each tooth variations in dental materials need to be charted
Step 7	have a second DO double-check the documentation	 when comparing manually, put results into reconciliation chart DOs must remain objective and under no circumstances make any assumptions a body without an AM dental record cannot be identified by dental means
Step 8	prepare and hand over the results to reconciliation	 ensure the PM section knows how to contact the AM and recon sections in case clarification is required

ANNEX C - RECONCILIATION PROCEDURES

Step 1	compare AM and PM data using the Dental Reconciliation Sheet (Annex G)	 when using digital data collation systems, the system will provide automated comparison and probabilities of matches that will be submitted DOs are required to manually go through and compare each of the generated matches use the ISO 3950 system for charting in multinational and civilian-military settings INTERPOL recommends "DVI System International" by Plass Data® in the multinational and civ-mil setting use black ink when charting manually when manually checking matches work through AM and PM details and identify the most possible matches based on unique findings such as: missing teeth unrestored dentition. dentitions with routine restoration. dentitions with crown and bridgework. dentitions with dentures. dentitions with implants.
Step 2	search for inconsistencies between AM and PM data and evaluate the probability of matches	 use PM and AM forms and compare all aspects of the findings discrepancies must be resolved DOs must reconcile inconsistencies if inconsistencies cannot be explained, immediate identity is not possible
Step 3	if match is likely	 check x-rays root filling and their shape crowns and bridgework shape of dental roots any other comparable information check images for patterns of restorations check dentures, orthodontic appliances and dental implants one unexplainable discrepancy is more important than many consistencies

Step 4	result of reconciliation	_	Identification
		_	Identification probable
		-	Identification possible
		-	Identification excluded
		-	Insufficient evidence
Step 5	identification of human remains with	-	have the documentation double-checked by a second DO
	presentation to identification board	-	present the results to the board and be ready to provide a detailed explanation

ANNEX D - FORENSIC DENTAL IDENTIFICATION EQUIPMENT LIST

The recommended equipment list contains common equipment familiar to all nations. Reproducible outcomes are more likely achievable if all nations use the same equipment.

ABFO No 2 Scale
Acid etch
Adhesive labels
Alcohol spray
Alcohol wipes
Annex A, AM procedures
Annex B, PM procedures
Annex C, Reconciliation procedures
Annex E, ISO - Universal nomenclature comparison chart
Annex G, dental reconciliation sheet
Aprons, surgical, disposable
Bags, garbage
Bags, plastic, zip-lock large
Bags, plastic, zip-lock small
Bite blocks
Bone mallet
Boots, rubber
Bowl, clinical kidney shaped
Camera digital memory cards (spare)
Camera ringflash, speedlight for dental photography
Camera, digital camera (SLR) with macro-lens
Cassettes for dental instruments
Cellulose wadding
Clipboards
Colander
Computer, laptop
Cotton wool rolls
Dental codes, laminated
Dental probes, hooked
Dental probes, periodontal
Dental probes, straight
Extension cord, surge protected 10 m
Eye protection (facial shield)
Facemasks, disposable (several sizes latex-free)
Gauze pads
Gloves, household
Gloves, rubber disposable (several sizes, latex-free)
Glue stick
Gowns, surgical, disposable (long with cuffs, latex-free)
Hand saw
Handles mouth mirror
Hats, surgical, disposable (latex-free)
Headlight (with spare bulbs and batteries)
Hemostats, curved
Hemostats, straight
Henning plaster spreader or other instrument to open jaws
Hole punch

Hydrogen peroxide
Impression trays
INTERPOL AM forms
INTERPOL PM forms
ISO 3950 - designation of teeth and areas of the oral cavity
Light boxes
Light, pen light, fiber optic light (with spare bulb/batteries)
Magnifying glass/loupes
Markers, permanent
Medical waste container
Mixing bowl
Molt mouth props
Mouth mirrors
Notebooks
Paper towel
Parcel string
Pencils
Pens
Photograph cheek retractors
Photograph intraoral mirrors
Plaster of Paris
Radiographic film mounts
Radiographic films
Radiographic film processing chemicals and equipment
Radiographic nim processing chemicals and equipment Radiographic sensor set (digital)
Radiographic serisor ser (digital) Radiographic unit, portable dental (with reserve battery)
Ruler, folding Ruler, office
Scalpel blades No 20
Scalpel handles No 4
Scissors, curved pointed
Scissors, office
Scissors, straight
Skull key
Sodium hypochlorite solution
Software, current version of DVI System International by Plass Data®
Software, current version of Microsoft Office®
Software, current version of Microsoft Windows®
Spatula
Stapler
Staples remover
Syringe, irrigation
Tape measure
Tongue depressors
Toothbrushes
Trays

ANNEX E – COMPARISON OF ISO 3950 AND UNIVERSAL NOMENCLATURE

Use of a "common language" is central to optimizing the reliability of the identification process. All participants of this STANAG will use the ISO 3950 notation when operating in multinational or civil-military DVI scenarios.

The tables below are provided as a reference tool for DOs who are not familiar with the ISO 3950 notation or the Universal Numbering System. It is important for all DOs to understand both systems so that they can accurately assess AM records that use either notation.

1. ISO 3950 Scheme

Right Left																
00											Oral cavity					
							0	1								Maxillary area
			1	0							2	0				Quadrant
		03					0	4					05			Sextant
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	Permanent teeth
			55	54	53	52	51	61	62	63	64	65				Deciduous teeth
			85	84	83	82	81	71	72	73	74	75				Deciduous teeth
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	Permanent teeth
	08 07 06									Sextant						
40						30					Quadrant					
	02									Mandibular area						

2. UNIVERSAL Scheme

	Permanent teeth														
upper right								upper left							
1	1 2 3 4 5 6 7 8					တ	10	11	12	13	14	15	16		
32	32 31 30 29 28 27 26 25						25	24	23	22	21	20	19	18	17
	lower right									I	owe	r lef	t		

	Deciduous teeth										
u	nt		upper left					it			
	Α	В	O	D	Е	ŀ	G	Н	ı	٦	
	Т	S	R	Q	Р	0	Ν	М	L	K	
lo	nt				I	owe	r lef	t			

3. Permanent Teeth Comparison

ISO 3950 (FDI Notation):

18															
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

UNIVERSAL:

1															
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

4. Deciduous Teeth Comparison

ISO 3950 (FDI Notation):

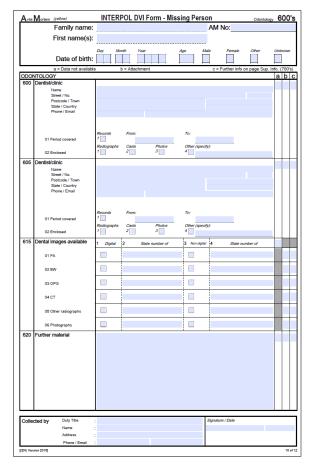
55									
85	84	83	82	81	71	72	73	74	75

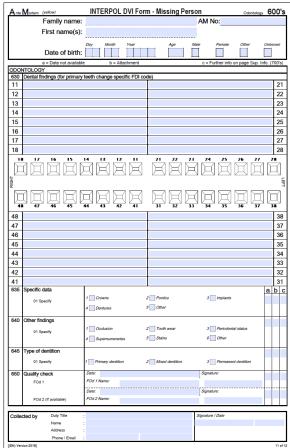
UNIVERSAL:

Α	В	С	D	Ε	F	G	Н	1	J
Т	S	R	Q	Р	0	Ν	М	L	K

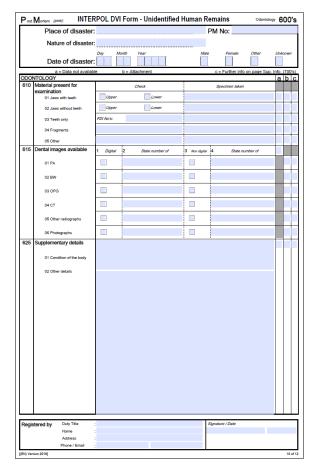
ANNEX F - INTERPOL FORMS

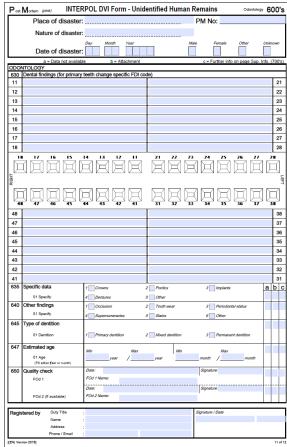
Missing Person Form (AM) - Odontology Section 600's:





Unidentified Human Remains Form (PM) - Odontology Section 600's:





			Al	NNE	(G – DENTA	L F	RECONCILIA	ATION SHEET						
Disa	ster:					Date:								
PM Number: Height:						AM Number: Name: Age: Height:								
Tooth			PM Fine	dings				AM Findings		Tooth	Score*			
18						l				18				
17										17				
16										16				
15										15				
14										14				
13						_				13				
12										12				
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23 24						-				23 24				
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26						-				26				
27						-				27				
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37						1				37				
36						┢				36				
35						┢				35				
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32										32				
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42						l				42				
43						1				43				
44						l				44				
45										45				
46										46				
47						l				47				
48										48				
				ore	e: X = elimination	on — = uncertain	0 =	identific	ation					
Conclusion:														
Identi	ficatio	n:	establishe	d	probable		possible	excluded		fficient ence				
Date	:	Name	:	Sign	ature:		Date:	Name:	Signat	ure:				
				3.					3					

Identification	absolute certainty that the PM and AM records are from the same
	person
Identification probable	specific characteristics correspond between PM and AM but either PM or AM data or both are minimal
Identification possible	there is nothing that excludes the identity but either PM or AM data or both are minimal
Identity excluded	PM and AM records are from different persons
Insufficient evidence	neither PM nor AM comparison can be made

ANNEX H – LITERATURE

- 1. The North Atlantic Treaty, Washington D.C. 4 April 1949
- 2. INTERPOL DVI Guide 2018 with Annexures
- 3. Forensic dentistry, Editors: David R. Senn, Paul G. Stimson 2nd ed., ISBN 978-1-4200-7836-7
- 4. ISO 3950, Dentistry Designation system for teeth and areas of the oral cavity
- 5. ISO 20888, Dentistry Terminology for forensic oro-dental data

AMedP-3.1(B)(1)