

## CASE REPORT

*Robert B. Brannon,<sup>1</sup> D.D.S., M.S.D. and William M. Morlang,<sup>2</sup> D.D.S.*

# The Crash of LOT Flight 007: Dental Identification\*

**ABSTRACT:** The authors record the contribution of dentistry to the identification of American victims of one of the most significant aircraft tragedies involving American athletes—the March 1980 crash of a Soviet-made Ilyushin 62 Polish jetliner and the deaths of 31 Americans including a 22-member U.S. amateur boxing team with several U.S. Olympic team candidates. Preparedness was a factor in the dental team's ability to resolve many notable and unexpected problems. Jurisdictional restraints that Polish authorities imposed on the U.S. investigative team hindered its efforts to identify American passengers. The team used dental and fingerprint methods of identification whenever possible and obtained further evidence from anthropologic methods, visual recognition, and personal effects. Dental readiness, organization, methodology, and lessons learned are documented in this paper.

**KEYWORDS:** forensic science, forensic odontology, dental identification, aircraft accidents, mass-disaster investigation, American athletes, sports

The crash of LOT Airlines Flight 007 near Okecie Airport in Warsaw, Poland, on March 14, 1980, took the lives of 77 passengers and 10 crew members and, at the time, was the worst air crash in Poland's history (1). Among the 31 American passengers in the Soviet-made Ilyushin 62 jetliner was a 22-member U.S. amateur boxing team with 14 athletes. Their loss was devastating to the American amateur boxing ranks because many were contenders for the U.S. Olympic team (2). The deaths of the 14 American boxers rank as the second worst foreign air tragedy involving American athletes, exceeded only by the 18 U.S. figure-skating athletes who were killed in a Sabena jet near Brussels, Belgium, in 1961 (1). Prior to the LOT Flight 007 crash, there were five fatal air-transport accidents involving American athletic teams from 1931 to 1980 (1,3). To our knowledge, two have occurred since (4,5).

In Warsaw, the Ilyushin 62 exploded on its approach to the airport as a result of an engine-component failure and crashed and burned in an embankment and 40-foot-deep moat surrounding an old military fortification that was 950 m from the approach end of the runway (6). The nature of the crash and strict constraints that the government imposed caused a myriad of unusual and frustrating problems for the U.S. identification team, which included component teams from the Armed Forces Institute of Pathology (AFIP). As a result, investigators had to rely heavily on visual recognition and personal effects to assist in the identification. They also used standard fingerprint, dental, and anthropologic methods.

The purpose of this paper is to chronicle the valuable role that dentistry played in the investigation and identification process of one of the most significant fatal aircraft accidents involving American athletes and to record its historical significance with emphasis on the unique problems encountered and lessons learned. In preparation for the article the authors reviewed, categorized, and tabulated data from the official AFIP dental findings and literature (7), relied on their own firsthand experience as members of the AFIP dental-identification team, and considered the organization, procedures, victim processing, and problems that directly affected the dental team.

### Response Team

At the request of the Polish government, the U.S. State Department directed an AFIP and FBI forensic identification team to Warsaw, Poland, to aid in the identification of the Americans who perished in the disaster. The AFIP Department of Oral Pathology was charged with providing the forensic-dentistry support for this endeavor and was directed to send a six-member response team within 24 h. At the time, the Department of Oral Pathology complemented the AFIP Department of Forensic Sciences with forensic pathology, aerospace pathology, and toxicology divisions. The dental team was composed of four U.S. Air Force (USAF) dental officers: two general dentists, one endodontist, and one AFIP oral pathologist. All had mass-disaster experience. The chief of the Forensic Dentistry Section was a dental officer who had the most mass-disaster experience. The dental support team consisted of two USAF dental technicians with dental-radiology experience at the mass-disaster level. The forensic dentistry armamentarium consisted of two ready-to-go mass-disaster kits that included a hand-dip rapid-development system for dental radiographs and a

<sup>1</sup> Oral and Maxillofacial Pathology Department, Louisiana State University School of Dentistry, New Orleans, LA.

<sup>2</sup> Forensic odontologist, 9317 Gloxinia Drive, San Antonio, TX.

\* Presented at the 54th Annual Meeting, American Academy of Forensic Sciences, Atlanta, GA, February 14, 2002.

Received 26 Feb. 2002; and in revised form 22 May 2002; accepted 8 June 2002; published 2 Oct. 2002.

portable, self-contained 50-kVP Endo X-ray unit. Dental radiology was crucial to the investigation.

### Identification Data

#### *Constraints on Identification*

The dental-identification team was the last component of the identification team to arrive in Warsaw. They arrived at 1430 hours on March 23rd and departed at 0945 hours on March 27th and thus were allowed very little time in the identification center, which was in the central mortuary in Warsaw. The prosecutor of Warsaw was in charge of the identification process and kept the entire U.S. identification team under constant pressure by setting deadlines for completion of the identification process. In addition, Polish authorities would not allow the U.S. team to inspect all of the remains. In fact, the U.S. forensic pathologists were allowed to examine only 44 victims and the dental team only 34. Reasons for this limited access were not made clear to the U.S. team. However, the following, if true, may have played a role in the prosecutor's decisions. The U.S. team was unofficially informed that Polish law at that time required burial within 72 h of death, and therefore time was important. Also, The Associated Press news service reported that Polish officials claimed they had identified about 70% of the victims (8). Therefore, the Polish authorities may not have perceived a need for re-examination of the "identified" Polish victims. Perhaps the U.S. team was allowed to examine only those cases thought to be Americans.

#### *Identified and Unidentified Remains*

Members of the U.S. Amateur Boxing Federation who flew to Warsaw after the crash visually identified some of the victims of the athletic team. Of the 31 American passengers, 30 were positively identified. There was corroboration either by age, race, gender, hair color, scars, or, when appropriate, medical history for each of the 30 victims identified, and often several of these characteristics supported the identification. Table 1 shows the methods of identification for the Americans. A total of 11 (36.6%) of the 30 identified victims were identified by dental means. Dental comparison was the only means of positive identification for eight (26.6%) victims. Dental plus visual (two victims) and dental plus fingerprints and visual (one victim) accounted for three positive identifications or 10%. Dental findings were supportive in one victim (Table 1).

The unidentified American victim may have been extremely fragmented, or the team may not have been provided the remains to examine. Three days after the accident American Embassy officials learned that at least 15 victims were so badly dismembered that they probably could not be identified (9). On March 20th the official Polish news agency, PAP, corroborated this information (10). Whether or not the imposed limited access to the deceased prevented identification of all of the Americans remains conjectural.

Every mass disaster has problems that make it unique. The disaster in Warsaw was no exception with its overriding governmental policies complicating the resolution of numerous forensic problems. International cooperation is often less than ideal when citizens of one country perish in a mass disaster that has occurred in another (11,12), as they did in this particular disaster.

#### *Preplanning Aspects*

Faced with assembling a six-member forensic dental team under the deadline of a next-day departure, the chairman of the AFIP Oral Pathology Department selected the most experienced members

TABLE 1—*Methods of identification.\**

Method	Number of Bodies
Dental Only	8
Fingerprints Only	7
Visual Only	4
Dental and Visual†	2
Fingerprints, Visual, and PE	2
Visual and PE	2
Dental and Fingerprints	1
Dental, Fingerprints, and Visual	1
Fingerprints and Visual	1
Fingerprints and PE	1
PE Only	1
Unidentified	1
Total	31

\* Four victims positively identified by fingerprints bypassed the dental section.

† Dental findings supportive in one victim.

PE = Personal effects.

from its response-team roster. All of the selected members had participated in at least two of the three previous mass disasters in which the USAF dental team had participated (12–14). Following the Jonestown tragedy, the Oral Pathology Department had assembled and made readily available for shipment transportable dental supplies and equipment. Thus, because of this preplanning, the team lost no time deploying to the site of the disaster.

#### *Identification Center Facilities*

The area of the morgue where the entire U.S. identification team was relegated to work was extremely cramped and consisted of a short, narrow hallway and one room that could hold a maximum of two gurneys. The work area was extremely cold (snow was on the ground in Warsaw) and without heat of any kind. Nevertheless, the dental team followed protocol and set up a dental section with its attendant subsections—postmortem dental examination and radiology, antemortem record reconstruction, and records comparison.

#### *Postmortem Examination and Radiology Subsection*

Two dentists and a dental technician composed the postmortem team. All of the victims whom the dental team was permitted to examine demonstrated moderate-to-severe injury patterns. Fragmentation of jaws and dental structures and, in some instances, lack of dental structures affected postmortem data collection. There were no burn victims among the bodies examined. Rigor mortis of mastication muscles was not a problem, thereby allowing free access to the oral cavity in those with intact oral structures. Although the number of bodies that the team was allowed to examine was relatively small, the team knew that there was no room for error because of the strict, unwavering restrictions that the authorities had imposed. Re-evaluation of remains was virtually impossible. Therefore, a system of validating every exam became even more important. The team decided to repeat each examination procedure during the initial examination to help provide more accurate documentation and thus to validate each exam. This method of redundancy allowed for verification of findings and consultation on questionable findings (15).

The role of one technician was to take postmortem radiographs on each victim, including, whenever possible, a full-mouth series of periapical radiographs. Periapical radiographs would increase the chances for identification because they would show the entire

tooth, its surrounding bony trabecular pattern, and bone loss from periodontal disease. A significant problem was the temperature in the work area. It was so cold in the morgue that the radiographic film could not be processed, so the other dental technician processed the film in his heated hotel bathroom. The Polish Secret Police provided an unsolicited chain of custody, shuttling the dental radiographs to and from the hotel and morgue. Needless to say, the dental team had no say or participation in the transport of the postmortem radiographs. Therefore, it set up a tracking system and evaluated it every evening in the hotel to be sure that what it sent it received at both sites.

#### *Antemortem Record Reconstruction Subsection*

Two dentists were assigned to the Antemortem Record Reconstruction Subsection. Because comparing antemortem dental records from dental offices with postmortem dental records is difficult, if not impossible, the team transcribed for each victim all antemortem dental evidence to a single antemortem dental-record form in order to create a composite antemortem picture in a common charting format. The composite made comparison of the reconstructed antemortem dental record to the postmortem findings recorded on the postmortem dental record much easier. The team used a multiple verification technique in the reconstruction of antemortem dental records. One dentist would transcribe the antemortem dental-record information to a standardized form, which a second dentist would then verify. Though the team had antemortem dental records for all 31 victims, a recurring problem was that many dental records were not current and/or difficult to interpret and often required an assumption to resolve discrepancies and questions. In addition, because FBI fingerprint comparison had already identified four specific victims, the dental team was bypassed even though antemortem dental records were available. Ideally all available means of identification should have been used to increase the validity of the identification, but in this instance they were not because of the time constraints the U.S. identification team faced. Remains bypassing the dental section in the identification process is not unique to this disaster (16,17), but is rarely reported.

#### *Records Comparison Subsection*

The Records Comparison Subsection was composed of all four dentists. All postmortem records and radiographs were compared manually with the completed composite antemortem records and radiographs. This section also used multiple verification and an official dental-identification summary form to summarize the identification data and to document the decision-making process. The chief and a minimum of two dentists who were in agreement with the final interpretation signed the form. The degrees of certainty were essentially (1) positive identification (certainty), (2) consistent with (findings support an identification but not to a degree allowing certainty), and (3) unidentified (insufficient evidence). All positive dental identifications were made by comparison of antemortem charts and radiographs with postmortem charts and radiographs.

#### **Lessons Learned**

1. Major problems that can affect a forensic dental team in time of mass disaster include jurisdictional and political issues and unyielding governmental authorities.
2. Poor identification facilities can hamper forensic dental operations as they did in this disaster. Further testimony to this fact

was vividly illustrated in the recommendations made following the Korean Airlines Flight 801 accident in 1997 (18). Facility-requirement planning is essential, but, when the team travels to foreign destinations, poor facilities may await, thus making preparedness all the more important.

In the years that followed the crash of LOT flight 007 there have been countless disasters, many on a small scale and on foreign soil to which the AFIP dental identification team has been deployed, but the lessons learned in Warsaw significantly enhanced the team's knowledge and ability to prepare for and to work under adverse conditions and circumstances.

#### *Acknowledgments*

We wish to acknowledge Michael Higgins, editorial consultant, Maureen Raymond, computer services software supporter, and Elizabeth Strother, head dental librarian, for their assistance in the preparation of this article. All are with the Louisiana State University School of Dentistry.

#### **References**

1. Boxers' death. *Time* 1980 Mar 24;115:41.
2. A boxing team's fiery death. *Newsweek* 1980 Mar 24;95:60-1.
3. Murphy GK. Fatal air transport accidents involving athletic teams from the United States. *J Forensic Sci* 1997;42:74-8.
4. Four Iowa athletes among 7 dead in plane crash. *The New York Times* 1985 Nov 26; Sect. A:16 (col. 1). [database online] available from Lexis-Nexis Academic Universe, News: General News. Accessed June 28, 2001.
5. Wahl G, McKenzie M. Air of trepidation. The latest sports tragedy points up the risks of road trips. *Sports Illustrated* 2001 Feb 5;94:35.
6. Disk failure cited in Polish crash. *Aviat Week & Space Technol* 1980 June 2;112:27.
7. Brannon RB, Keesler HP. Problems in mass-disaster dental identification: a retrospective review. *J Forensic Sci* 1999;44:123-7.
8. [no title] *The Associated Press* 1980 Mar 14, p.m. cycle, International News. [database online] available from Nexis-Lexis Academic Universe, News: Wire Service Reports. Accessed November 28, 2000.
9. Prinz R. Polish rescue workers recover all but 12 bodies, find flight recorder. *The Associated Press* 1980 Mar 17, a.m. cycle. International News. [database online] available from Lexis-Nexis Academic Universe, News: Wire Service reports. Accessed November 28, 2000.
10. Black box from plane goes to commission. *The Associated Press* 1980 Mar 20, a.m. cycle, International News. [database online] available from Lexis-Nexis Academic Universe, News: Wire Service Reports. Accessed November 28, 2000.
11. Solheim T, van den Bos A. International disaster identification report. Investigative and dental aspects. *Am J Forensic Med Pathol* 1982;3: 63-7.
12. Brannon RB, Morlang WM. Tenerife revisited: the critical role of dentistry. *J Forensic Sci* 2001;46:722-5.
13. Morlang WM, Wright LS. Lessons from the Big Thompson Canyon. *Gen Dent* 1978;26:36-9.
14. Brannon RB, Morlang WM. Jonestown revisited: the role of dentistry. *J Forensic Sci* 2002;47:3-7.
15. Vale GL, Noguchi TT. The role of the forensic dentist in mass-disasters. *Dent Clin North Am* 1977;21:123-35.
16. Gillespie TH, Brannon RB, Grayson FW, Gardner JD. Dental identification of remains from the 23 October 1983 bombing of the U.S. Marine Headquarters, Beirut, Lebanon. *Mil Med* 1985;150:635-9.
17. Kessler HP, Pemble CW. Forensic dental identification of casualties during Operation Desert Storm. *Mil Med* 1993;158:359-62.
18. Fixott RH, Arendt D, Chrz B, Filippi J, McGivney, Warnick A. Role of the dental team in mass fatality incidents. *Dent Clin North Am* 2001;45:271-92.

Additional information and reprint requests:

Dr. Robert B. Brannon  
Department of Oral and Maxillofacial Pathology  
Louisiana State University School of Dentistry  
1100 Florida Avenue  
New Orleans, LA 70119