



## Physical Anthropology Section – 2008

---

### H4 Surgical Sutures as a Means of Identifying Human Remains

*Katy L. Shepherd, BS\*, 10101 Villagio Palms Way, Unit 201, Estero, FL 33928; Heather A. Walsh-Haney, PhD, Florida Gulf Coast University, Division of Justice Studies, 10501 FGCU Boulevard South, AB3, Fort Myers, FL 33965-6565; and Marta U. Coburn, MD, District 20 Medical Examiner, 3838 Domestic Avenue, Naples, FL 34104*

After attending this presentation, the audience will understand how surgical sutures found in human remains may be used to help establish a positive identification.

This presentation will impact the forensic community by providing anthropologists, medical examiners, coroners, and law enforcement another tool to aid in identifying decedents. This presentation also demonstrates the investigative process used to pinpoint suture manufacturers, and in turn the identification of the victim, by presenting a case where surgical sutures were a distinctive characteristic.

In 2006, a set of skeletonized remains was discovered in a dense, wooded area adjacent to a residential gated community in Naples, Florida. The human remains consisted of a nearly complete skeleton and associated physical evidence that included a .357 magnum (found beside the remains), one spent bullet and shell casing, several unfired bullets contained within a box of ammunition, and a bicycle. Upon initial examination by the medical examiner and law enforcement personnel, the cranium was found to be fragmented, and the mandible had a midline fracture. Based on the scene evidence, the preliminary cause and manner of death appeared to be consistent with a single suicidal gunshot wound to the head. No identification was found with the remains nor was fingerprint evidence an option. A tentative identity was established by tracing the serial number on the gun.

The forensic anthropologist conducted an osteological analysis of identity, trauma, and time since death. As such, the metric analysis of sex, ancestry, and stature using Fordisc 3.0 determined that these remains were a White (e.g., European American) male approximately 5'10" in living stature. Nonmetric analysis of the skull and pelvic morphology supported the metric sex and ancestry findings. Radiographic and gross examination of the skeletal remains, both before and after reconstruction, evidenced one cranial gunshot wound that entered on the right and exited on the left. Skeletal age was determined through visual examination of all joint surfaces, including the pubic symphysis, auricular surfaces of the ossa coxae, and sternal end of the right 4th rib and subsequent comparison with known age exemplars for White 20th century males. The most accurate age estimation was determined to be between 50 and 60 years of age. Time since death was determined to be from weeks to months and no more than one year as evidenced by the extent of skeletonization, lack of the odor of decomposition, relative completeness of the remains, and the mechanical integrity of the bones.

Two green surgical sutures were discovered imbedded in the right acromial process of the scapula, which suggested that the decedent had undergone rotator cuff surgery—either as rotator cuff tendon repair, acromioplasty, or subacromial decompression. The dearth of published casework and research concerning the use of surgical sutures in human identification and the establishment of time since death required a consultation with a local suture and orthopedic implant manufacturer. To wit, several suture manufacturers were considered and the tentative identity was further bolstered by the biological profile and previous rotator cuff surgery.

There are several types of non-absorbable sutures, including, silk, nylon, polyester, polypropylene, and surgical steel. Non-absorbable and steel sutures are more likely to be found in forensic cases than absorbable sutures, so the concentration for this presentation will be on the former. Each manufacturer produces non-absorbable sutures of various colors and diameters that are determined by the suture material and the designed medical use. Non-absorbable sutures may be further classified based on whether they are constructed as a monofilament or multifilament (e.g., twisted together, spun together, or braided).

In addition to color, diameter, and construction materials, a non-absorbable suture's degradation may also help provide information concerning when surgery may have occurred and perhaps help narrow the time since death. While most non-absorbable sutures do not degrade completely, some materials, such as silk and nylon, do progressively lose their tensile strength. As such, suture manufacturing companies are able to assist in estimating timelines—whether determining when the surgery may have taken place or estimating time since death—based on degradation of the sutures as assessed by changes in the suture's mechanical properties. There are several surgical suture manufacturers, each with readily available information on their products and these include: DemeTECH®, Arthrex®, United States Surgical™, Syneture™, Ethicon®, and CP Medical®. Many manufacturing companies have employees who are able to identify their products simply by visual recognition and can reference in-house research reports that address suture use, properties, and degradation. Therefore, when medical examiner's and coroner's offices, law enforcement agencies, and forensic anthropologists find surgical sutures with human remains, a useful investigative tool exists to narrow down the suture manufacturer, and may aid in determining the decedent's identification and time interval since death.

---

#### **Surgical Sutures, Identification, Human Remains**