



## Technical note

## A facial reconstruction and identification technique for seriously devastating head wounds

Marek Joukal<sup>a,\*</sup>, Jan Frišhons<sup>b</sup><sup>a</sup> Department of Anatomy, Faculty of Medicine, Masaryk University, Kamenice 3, Brno 625 00, Czech Republic<sup>b</sup> Institute of Legal Medicine, St. Anne's University Hospital Brno and Faculty of Medicine, Masaryk University, Tvrđého 2a, Brno 662 99, Czech Republic

## ARTICLE INFO

## Article history:

Received 12 May 2014

Received in revised form 15 October 2014

Accepted 22 April 2015

Available online 28 April 2015

## Keywords:

Reconstruction technique

Facial identification

Crush head injury

Polystyrene head model

Train–pedestrian accident

## ABSTRACT

Many authors have focused on facial identification techniques, and facial reconstructions for cases when skulls have been found are especially well known. However, a standardized facial identification technique for an unknown body with seriously devastating head injuries has not yet been developed. A reconstruction and identification technique was used in 7 cases of accidents involving trains striking pedestrians. This identification technique is based on the removal of skull bone fragments, subsequent fixation of soft tissue onto a universal commercial polystyrene head model, precise suture of dermatomuscular flaps, and definitive adjustment using cosmetic treatments. After reconstruction, identifying marks such as scars, eyebrows, facial lines, facial hair and partly hairstyle become evident. It is then possible to present a modified picture of the reconstructed face to relatives. After comparing the results with photos of the person before death, this technique has proven to be very useful for identifying unknown bodies when other identification techniques are not available. This technique is useful for its being rather quick and especially for its results.

© 2015 Elsevier Ireland Ltd. All rights reserved.

## 1. Introduction

Visual facial identification of an unknown body after a seriously devastating head injury is very difficult and in some cases impossible. These injuries are frequently seen from accidents wherein a train strikes a pedestrian. The most damaged are those parts of the body struck directly by the front of the train. Other, secondary injuries such as amputation of acral parts of the body and tissue avulsions are caused by the body's being thrown or dragged. A few authors have focused on soft tissue for the purpose of head reconstruction. However, this technique is applicable only in cases when the damage to the cranial bones is not complete and the cranial bones can still form the basis for soft tissue suture. Because of these facts, our aim was to develop a technique that is feasible in normal dissection and inexpensive while still being sufficiently accurate in identifying an unknown person after a seriously devastating head injury involving the crushing of neurocranial and splanchnocranial bones.

## 2. Materials and methods

The reconstruction technique was used in 7 cases of devastating head wounds after accidents involving trains striking pedestrians. Each case involved a different level of crushing and direction of violence. Because of these facts, each face had to be reconstructed using an individual preparation technique. The set being studied was composed of the remains of 6 men and 1 woman ranging in age from 18 to 77 years. In this collection, there were 6 medico-legal autopsies and 1 forensic autopsy. For these cases, we had been requested to provide an approximation of the face, age, and basic identifying marks.

The damaged dermatomuscular flaps were uncovered together with muscles of facial expression from the bone remains after dissecting the organ complexes. Prepared soft tissue was fixed onto a commercial polystyrene head model (Spona s.r.o., model Phill) without any preservation in its anatomical position and the flaps were sewn together by atraumatic continuous suture (6-0). The universal polystyrene head model was used in all 7 cases without any shape correction because we couldn't determine type of skull after serious devastating wounds when skeleton of face and cranium was totally damaged and soft tissues fitted on it. At the end of this process, margins and skin lesions were adjusted using makeup mixed with calcium carbonate. Calcium carbonate increased the viscosity of the cosmetic treatment, which was

\* Corresponding author. Tel.: +420 549 49 6886; fax: +420 549 49 1320.

E-mail addresses: [mjoukal@med.muni.cz](mailto:mjoukal@med.muni.cz), [joukalmarek@gmail.com](mailto:joukalmarek@gmail.com) (M. Joukal).

advantageous in places with large defects. But it is possible also to use embalming wax and professional cosmetic treatments for embalmers (such as those from The Dodge Company and Champion Chemical). According to the identifying marks, an approximate description of the face and a photo was in each case provided to the police to support their investigation.

### 3. Results

We reconstructed the faces in all 7 cases using the technique described in the materials and methods. This section contains a detailed description of just two cases. Both involved successful police investigations, and in each case the description of the facial structure contributed to the identification of the unknown person.

One of the main applications of the reconstruction technique was in identifying an unknown person who had died after being struck by a train and in which case there was a suspicion of foul play being involved in the death. The case concerned a 23-year-old man with facial burns that had been healed by meshed dermoepidermal skin grafts. After facial reconstruction, it was possible to describe in detail the positions of the healed burns, the approximate facial structure, and even the approximate age. Age assessment from facial structure alone cannot be exact, but in this case it helped to focus the investigation on missing people from 20 to 30 years of age. The original age assessment according to the deceased's facial and other age estimation markers had pointed to an approximate age of 50 years, which was because of the healed facial burns and high facial devastation. Unfortunately, permission was not obtained from the bereaved to publish a photo of this case.

Permission was obtained to publish a photo from a case involving the suicide of a 77-year-old woman who had died after being struck by a train. Because of seriously devastating head injuries, the mechanism of trauma was unknown. A number of wounds were found in the face and are schematically visualized in Fig. 1. A soft tissue flap and bony fragments had been separated at the level of the basis of the mandible, on the boundary line of both zygomatic areas, anteriorly to the external acoustic meatus, and in the parietal area. There was discovered in this soft tissue flap a contusion at a medial angle to the right eye with an area of 3 cm<sup>2</sup> and a contused bruise 50 mm in length in an oblique direction reaching the external acoustic meatus. Another contusion was found on the area of the left upper eyebrow, from which an avulsion 70 mm in length ran in a lateral and superior oblique

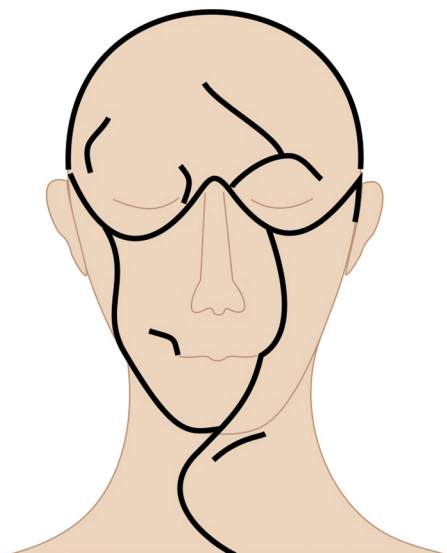


Fig. 1. Wound scheme of a 77-year-old woman.



Fig. 2. Body condition of the deceased person before the reconstruction technique.

direction. An avulsion was also found anteriorly to the left external acoustic meatus with a length of 60 mm. A soft tissue flap was practically removed in a line which went from the left side of the nose to the left angle of the mouth and then continued in an oblique direction to the right angle of the mandible and ended near the right external acoustic meatus. In the aforementioned soft tissue flap, there was an avulsion 50 mm in length which began at the right angle of the mouth and ran in a lateral and superior direction. Approximately 30 mm to the right of the midline there was an avulsion 100 mm in length which ran caudolaterally to the left side of the neck. A final avulsion (70 mm in length) was situated approximately 30 mm below the chin and ran in an oblique direction to the left side superiorly.

As previously mentioned, soft tissue preparation was begun after a standard dissection of organ complexes (Fig. 2). A modified collar incision was made above the jugular fossa in a dorsal direction to the level of the seventh cervical vertebra. Dermatomuscular flap with platysma muscle was pulled cranially up to the ramus and angle of the mandible. Then we removed all of the soft tissue from the remaining bone fragments (Fig. 3). In case of missing soft tissue, it is possible to find suitable substitutes in the dermatomuscular flap from the back or medial side of the thigh. Masseter muscle, temporal muscle, the cartilaginous part of the nasal septum and eye bulbs were removed from the prepared



Fig. 3. Soft tissue of the head after bone fragment removal.

Download English Version:

<https://daneshyari.com/en/article/95383>

Download Persian Version:

<https://daneshyari.com/article/95383>

[Daneshyari.com](https://daneshyari.com)