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Utilization of non-replanted hand for preparation of an anatomical specimen: a case report

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ABSTRACT
This article presents a case of a transcarpal amputation of the hand. The amputated hand was fragmented, with excessive tissue loss and was not suitable for replantation. As the carpal bones and some carpal ligaments were intact, the amputated hand was used for the preparation of an anatomical specimen which has been photographed and the pictures used for didactic purpose.
Keywords: hand amputation; replantation – contraindications; anatomical specimen.

INTRODUCTION

Hand surgery units are fairly commonly faced with situations where the amputated part of a hand (hand or digit) – for various reasons – is not suitable for replantation [1, 2]. On this occasion, the remnant underwent utilization according to the obligatory theatre procedure. However, in some circumstances the non-replanted hand/digit may be used for scientific or teaching purposes. An article has been found in the literature presenting the use of an amputated hand for preparing anatomical specimens showing the vascular net supplying structures of the hand, particularly the carpal bones [3].

In the author's institution, which has participated in the Replantation Service, patients with amputated hands or digits present relatively frequently; in most cases these parts are replanted. However, if there is severe damage, the replantation is cancelled due to minimal chance for the success of this operation. On these occasions, the remnants are sometimes used by the surgeons for training purposes. The amputee was prepared in the operative room for tracking the course of some anatomical structures (nerve or arterial branches, ligaments, pulleys, etc.) which are rarely seen during regular hand surgery operations. After completing the session, the remnants were given standard utilization. It seems that use of non-replanted hands/digits makes a reasonable alternative for its primary utilization.

This article presents a case of transcarpal amputation of the hand in the crush-avulsion mechanism. The amputated hand was not suitable for replantation and has been used as an anatomical specimen.

CASE REPORT

A 37-year-old patient was referred to the author's institution with subtotal, crush-avulsion amputation of his left hand at wrist level, caused by an industrial power-mill. The amputated hand was fragmented, with excessive tissue loss and was not suitable for replantation; therefore the operation consisted in coverage (fitting) of the stump of the wrist. As the amputation occurred in an avulsed mechanism and the carpal bones as well as some of the ligaments remained intact, it prompted the surgeon to use the amputated hand for preparation of an anatomical specimen. The non-replanted hand was left in the operative room. After the patient was awoken from anaesthesia and became fully conscious, his informed consent was obtained for using his amputated hand as an anatomical specimen.

The wrist was cleaned of the remnants of soft tissue and bone fragments, fixed and illuminated. Next, numerous photos were taken in different positions which exposed bony and ligamentous components of the intracarpal joint. The following structures were clearly shown on the specimen: bones of the proximal and distal rows of the wrist (Fig. 1, 2) and a unique view of the scapholunate and the lunotriquetral ligaments (Fig. 3). After completion of the session, the specimen was utilized.

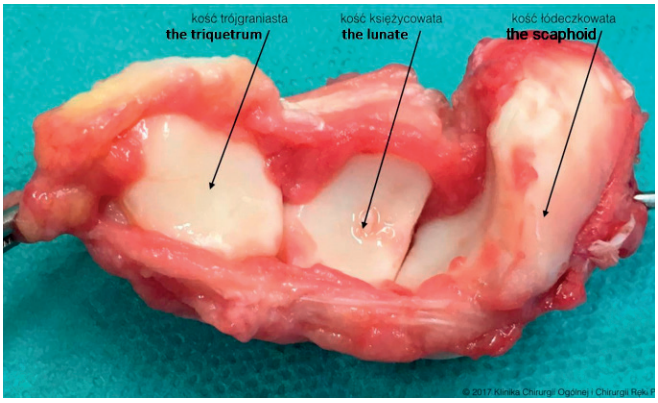

FIGURE 1. View of the proximal row of the carpal bones

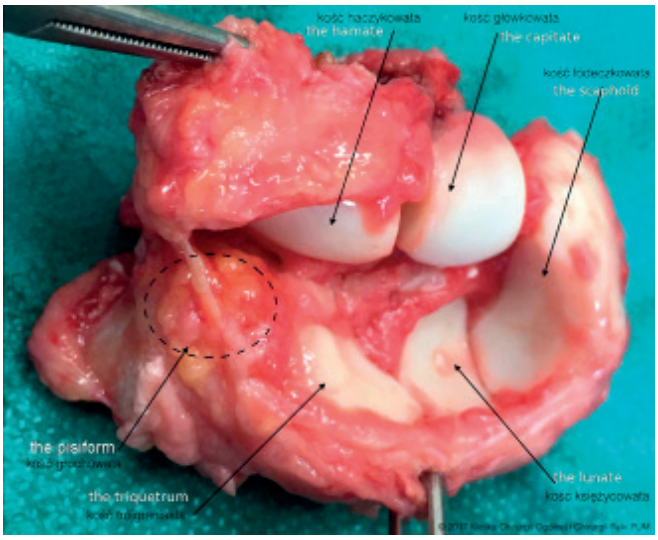

FIGURE 2. View of the proximal and distal rows of the carpal bones

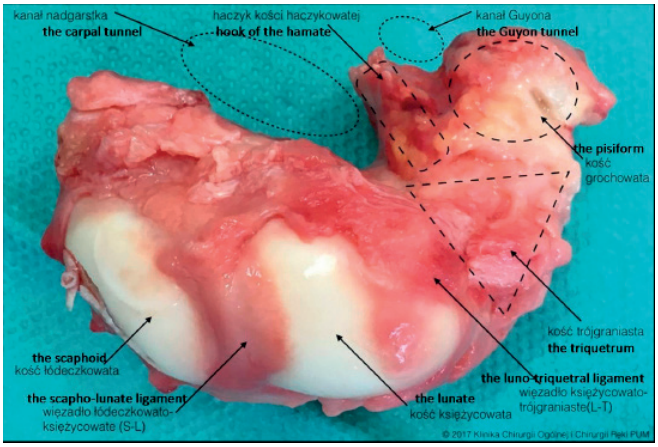

FIGURE 3. View of the proximal row of the carpal bones with the scapholunate and the lunotriquetral ligaments

DISCUSSION

Anatomical specimens prepared from fresh tissue are characterised by excellent quality in terms of natural colours and texture when compared to tissues fixed in formaldehyde. They are particularly valuable for preparing illustrations for anatomical atlases and books. The author has used pictures taken from this specimen in the chapter on wrist anatomy prepared for a book on hand surgery [4].

Only 1 article was found in the literature presenting the use of an amputated hand for the preparation of an anatomical specimen. The authors report a case of an elderly patient with a sarcoma of the upper arm who underwent amputation of the upper extremity. After obtaining informed consent from the patient, the hand was cut at the wrist level. The stumps of the radial and ulnar arteries were dissected, cannulated and filled with red-dyed epoxy resin. When the resin had hardened, all soft tissue was removed while leaving the resin intact. This resulted in obtaining a specimen showing the vascular net of the hand [3].

The author is aware that in some countries the laws about the use of patients' tissue for teaching purposes are tightening. Laws regarding storage of tissue should be obeyed and unethical practices should not be followed. There are several circumstances under which the use of non-replanted limbs are inappropriate, i.e. emergency procedures, where patients either have no time to consider their options or are unconscious, or in patients who are not in possession of their faculties.

The author believes that the presented case may be considered an option for a non-replanted hand. Instead of being utilized in its primary function, these body parts may become useful as anatomical specimen.

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