POST-TRAUMATIC THUMB RECONSTRUCTION WITH RADIAL FOREARM FLAP

AHMED ELSAFTAWY, JERZY JABLECKI

Department of General Surgery St. Hedwig of Silesia Hospital in Trzebnica
Ordynator: prof. dr hab. J. Jablecki

The study described a case of a 37-year-old patient, who had undergone avulsion amputation of the thumb, and was subject to a primary thumb reconstruction by means of thumb reconstruction with radial forearm flap, with the use of osseous fragments of the amputated thumb parts.

Key words: thumb amputation, post-traumatic reconstruction, radial forearm flap

Thumb defect may be related with prehensile function of the hand failure of up to 60%. Even in cases of considerable distal thumb amputations, we try not to shorten the stump by providing it with various flap types, which are aimed at first of all preserving maximum stump length possible, the best mobility in joints as well as good sensation.

Nearly every thumb amputation may be an indication to attempt at its replantation or revascularization. However, in certain cases, like amputations resulting from an avulsed limb, from scalping, from multiple-level amputations or the more distal ones, they pose a great challenge for a surgeon. Also unsuccessful replantations tackled by a surgeon dealing with hand injuries treatment may also be an indication to implementing the method presented. In such cases, post-traumatic thumb reconstruction with radial forearm flap is the optimal solution.

Proximal radial forearm flap is simply a modification of the popular Chinese flap. It may be used with the purpose of post-traumaticic reconstruction both of palmar and dorsal surfaces of the hand. It may also be used for reconstruction of more distant tissue defects as a free cutaneous and fascial flap.

For post-traumatic reconstruction of the thumb it may be used as radial forearm flap covering the skeletonized thumb fragment or other osseous transplant in the place of a thumb (e.g. harvested from the iliac spine). With this flap it’s possible to only harvest a vascularized osseous fragment from the proximal part of radial bone diaphysis in order to reconstruct the amputated thumb.

Another modification of this flap is the distal radial forearm flap, which may be used to cover defects in the area of ulnar articulation or as a free cutaneous and fascial flap with a neurovascular bundle (1, 2, 3).

Before deciding to use this flap type it is expedient to run Allen test in order to confirm the competence of palmar arch and the connection of the radial artery with the ulnar one; it is also extremely useful to carry out the so called blind Doppler examination (4).

When commencing the operational procedure, the amputated part of the thumb should be skeletonized from all soft tissues; in case of present IP joint, arthrodesis in physiological position is done. In addition, in some places the cancellous bone of the phalanx may be exposed in order to speed up the bone revascularization process. The “sculpted” thumb is stabilized by means of “K” wires in a proper position. When preparing the flap pedicle, we start from preparing the radial artery, which is situated between the flexor carpi radialis (FCR) and the brachioradialis (BR). When preparing the radial artery we clip all
other perforators that go deeper into the internal muscles of the forearm. The pedicle includes the radial artery, accompanying vein, and very often it is harvested together with the cephalic vein. If we decide to harvest the cephalic vein, it is crucial to carefully prepare it in such a way so as not to damage the sensory branch of radial nerve, which initially runs beneath the BR muscle, and then comes upon the radial part of dorsal forearm in the distal part, near the cephalic vein. Flap pedicle is abundant in adipose tissue, which makes it resistant to twisting even by 180°. After removing the flap and proximal clipping the radial artery as well as the cephalic vein, the pedicle gets tunneled beneath the skin in the ulnar area of the thumb. In case of a concern regarding the competence of the flap after guiding it into the subcutaneous tunnel, the tunnel should be cut open. The defect after radial forearm flap is primarily partly closed, partly by means of partly thin and free skin transplant. If flap pedicle has not been tunneled, or its part has been exposed, it is covered by identical free skin graft (1, 4, 5).

CASE REPORT

A 37-year-old patient was admitted to hospital at emergency replantation room with a complete left thumb amputation, avulsion amputation mechanism. The patient was disqualified from thumb replantation procedure, but instead it was proposed to him to run a primary reconstruction by means of the radial artery flap, to which the patient agreed. The operating procedure took approximately 3.5 hours. Post-operative progress was complicated by a fistula that formed in the central part of the phalanx, however after curettage and applying garamycin sponge, the post-operative progress proved successful. The patient uses the thumb for everyday work and is satisfied with it (fig. 1, 2, 3, 4, 5, 6).

In order to reconstruct the sensory part in a thumb reconstructed in the way shown above, Littler’s flap is harvested from the P2

---

Fig. 1. Avulsion amputation of the thumb in the middle of P1

Fig. 2. A – stabilizing of skeletonized thumb by means of „K” wires, B – preparated flap on the radial artery perforation

Fig. 3. Flap on the long pedicle during preparation for covering the defect

Fig. 4. Day seven after operation
ulnar part of the long finger on neurovascular bundle at a following stage. The patient though disagreed to the procedure due to possible occurrence of metacarpus scars.

This kind of method of post-traumatic thumb reconstruction doesn’t require expert microsurgical knowledge, which is indispensable in case of replantation or revascularization of the amputated thumb. It may also be implemented in emergency mode, yet like every method it may result in occurrence of complications. The main complications related to this method include:
– possibility of inflammation of the bone located under the flap as a result of insufficient vascularization,
– partial or entire necrosis of the flap,
– vicious cicatrix in the area of the harvested flap and its unaesthetic look,
– there are also possible cases of necrosis of the whole hand, which is a result of wrong judgment of Allen test (1, 6).

REFERENCES


Received: 13.10.2012 r.
Adress correspondence: 55-100 Trzebnica, ul. Prusicka 53/55