

APPLICATION MAXILLOFACIAL MICROSURGERY AT HANOI NATIONAL HOSPITAL OF ODONTO-STOMATOLOGY

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ABSTRACT

Background: Microsurgery is a highly complex technique that requires specialized equipment and steady surgical techniques. This is a retrospective review of the development progress of microsurgical techniques at Hanoi National Hospital of Odonto-Stomatology (NHOS) during the past 12 years. **Methods:** Retrospective study assessing the training and developing process of microsurgical techniques at NHOS in 12 years. **Results:** NHOS has performed 665 microsurgical flaps reconstructions after surgical removal of large tumors in maxillomandibular area. 441 fibular free flaps were harvested for mandibular reconstructions after resections of ameloblastoma and osteofibroma. 4 fibular flaps were used for maxillary reconstructions. 119 osteocutaneous fibular free flaps were harvested for mandibular reconstructions in oral cancer surgeries. 83 lateral arm flaps and 13 anterolateral thigh flaps reconstructions were performed following cancer ablations. 5 patients underwent reconstruction after cancer resection with 2 fibular free flaps and anterolateral thigh flaps. Success rate is 654/665 (98.35%). **Conclusion:** The implementation of microsurgery technique at NHOS has been carried out for only 12 years but rapid and significant progress has been made. Free flap reconstruction is a flexible reconstructive option to restore essential functions and aesthetics of the facial area and to improve the patient's quality of life.

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I. BACKGROUND

Hanoi National Hospital of Odonto-Stomatology (NHOS) is a large facility specializing in Odonto-Stomatology and Oral surgery. Reconstructive intervention after surgical removal of diseased area is very important. The resection of large benign tumors or malignant tumors always leaves big defects that cannot be repaired with conventional reconstructive techniques.

The advent of microsurgery has encouraged surgeons to use free flaps to overcome the challenges faced by reconstructive surgery using conventional techniques. Microsurgical techniques were originally developed since the 1970s of the last century. In the 1980s, Dr. Nguyen Huy Phan developed microsurgical techniques in Vietnam. The first microsurgeries were performed at 108 Military Central Hospital. The NHOS took initiatives to perform the first microsurgeries in 2008.

II. MATERIALS AND METHODS

In this review, we report the progress of surgical approach, training and development of microsurgery at NHOS in the period from 2008 to 2020. We access the number of performed microsurgeries, types of free flaps, pathological conditions that require microsurgery, complications and surgical outcomes, as well as the success rate after surgery.

III. RESULTS AND DISCUSSION

In 1984, NHOS set up an operating room for experimental microsurgery. As part of technology transfer program, the hospital cooperated with Mayo Clinic, USA, in 2005 and Faculty of Maxillofacial and Reconstructive Surgery of 108 Military Central Hospital in 2006. The surgeons of

NHOS perform first mandibular reconstructions with fibular flaps in 2008. In 2016, the hospital established a technology transfer cooperation with EDA Hospital, Taiwan. NHOS has performed 665 microsurgeries in total, of which 654/665 cases have successful outcomes.

Table 1: Total number of microsurgeries performed in period from 2008 to 2020

Free Flaps	Number of cases	Successful Outcome	Flap loss
Fibular flap	564	556	8
Lateral arm flap	83	80	3
Anterolateral thigh flap	13	13	0
Fibular free flap + Anterolateral thigh flap	5	5	0
Total	665	654 (98,34%)	11 (1,65%)

Venous thrombosis is the most common complication after reconstructive surgery. Flap necrosis was observed in 8 cases due to complications of venous thrombosis on the 2nd day after surgery. Other 2 cases of flap failure were reported on 3rd day after surgery due to complications of arterial thrombosis. In order to reduce thromboembolic complications, patients received 325 mg of Aspirin on the first day after surgery. One patient with diabetes experienced flap failure and non-healing wound due to arterial thrombosis complications.

Hanoi National Hospital of Odonto-Stomatology (NHOS) is a large facility specializing in Odonto-Stomatology and Oral surgery. Patients with large benign tumors (ameloblastoma, osteofibroma ...) frequently visit the hospital. The number of cancer patients coming for examination and treatment is also high. Thus, it is necessary to have a good surgical plan to treat the diseases

while maintaining patient's quality of life. The most commonly encountered benign tumors in the jaw area are ameloblastomas. The tumors can be located either in the maxilla or mandible, more frequently in the mandible. These lesions are invasive with high risk of recurrence if not completely resected. The most common benign neoplasia that originated from bone are osteofibromas. These slow-growing tumors can cause facial deformities when they grow too large and they are likely to regrow if not removed completely. Effective treatment of large benign tumors often requires maxillomandibular osteotomy that leave large bone defects to be reconstructed. We have performed reconstructions of mandible using 441 fibular flaps and reconstructions of maxilla using 4 fibular flaps after resection of osteofibromas and ameloblastomas in these areas.

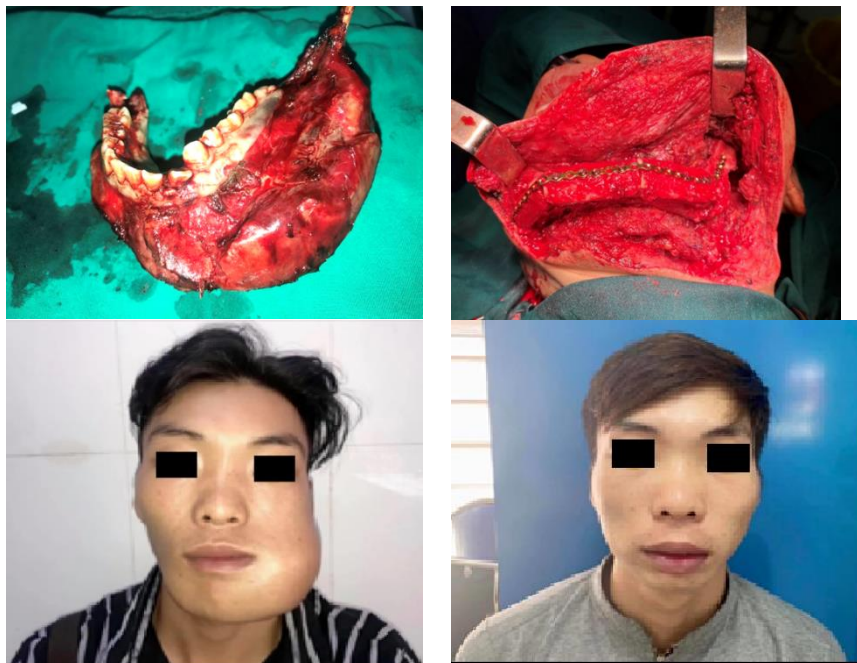


Figure 1. Mandibular reconstruction with fibular flap after tumor resection.

Oral cancer is the 6th most common malignancy worldwide. In Vietnam, afflicted patients often visit hospitals for diagnostic and treatment with advanced-stage and large tumors. Oral cancer does not respond well to radiation or chemotherapy, so extensive tumor resection and cervical lymphadenectomy are the best treatment options. Wide surgical excisions of tumor often leave major maxillomandibular defects such as mandibular-oral floor defect, oral floor defect, partial or total tongue defect, tongue-oral floor defect, cheek mucosa defect, orofacial fistula. The reconstruction

of these defects requires careful selection of suitable free flaps. We have harvested 119 osteocutaneous fibular free flaps to reconstruct the mandibular and to cover the oral floor; 83 lateral arm flaps for reconstructions of tongue, oral floor, buccal mucosa; 13 anterolateral thigh flaps to reconstruct major soft-tissue defects and to cover orofacial fistulas. The combination of both fibular flap and anterolateral thigh flaps is used in 5 cases to reconstruct mandible-oral floor and to cover the area after tumor resection.

Table 2. Classification of defects after tumor resection.

Type of defect	Number of cases	Harvested free flaps
Maxillary	4	Fibular flap
Mandibular	441	Fibular flap
Mandibular + Mucosal	119	Skin flap - Fibular flap
Soft tissue	96	Lateral arm flap, anterolateral thigh flap
Skin - mandibular - Mucosal	5	Fibular flap + anterolateral thigh flap
Total	665	

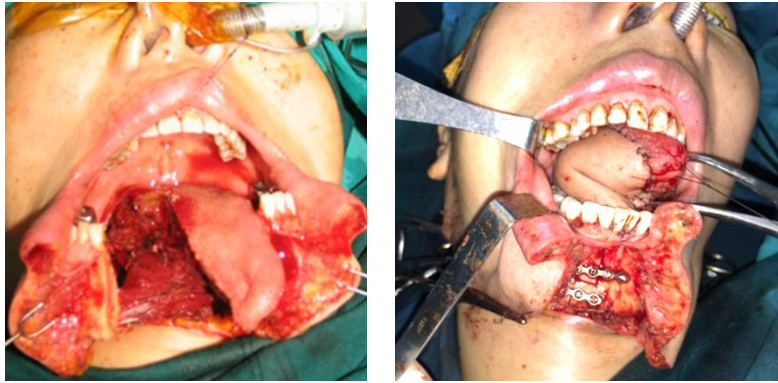


Figure 2. Tongue reconstruction with lateral arm flap.



Figure 3. 6 months after tongue reconstruction.

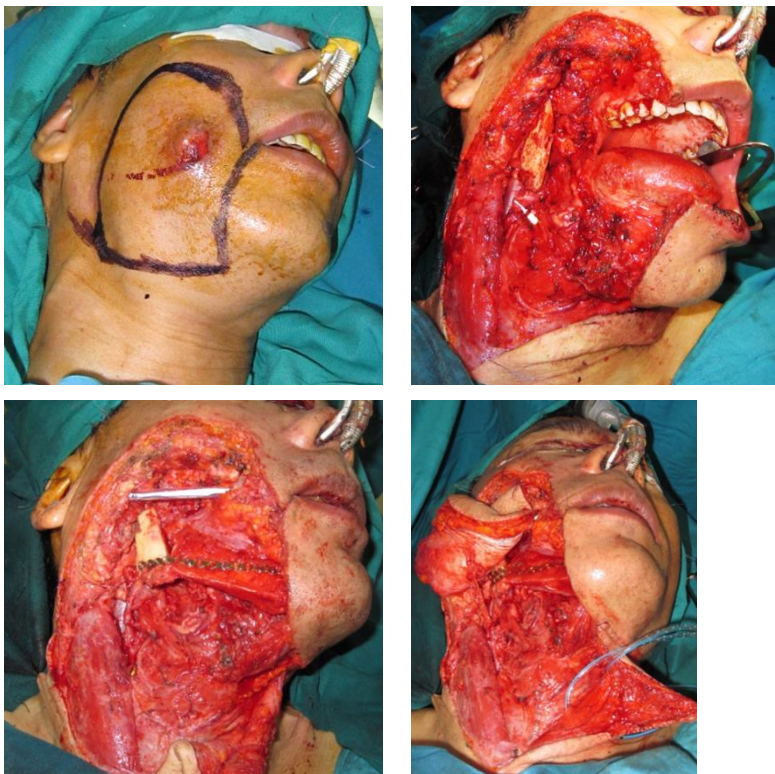




Figure 3. Mandibular and oral floor reconstruction with skin flap and fibular flap. Anterolateral thigh flap to cover affected area

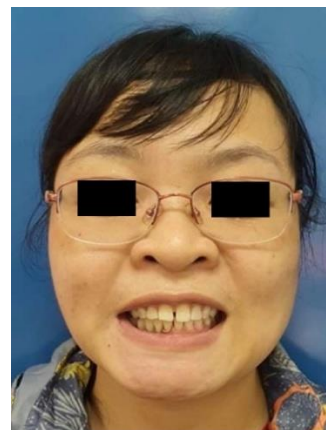


Figure 5. Mandibular reconstruction with fibular flap and 1 year after surgery.

IV. CONCLUSIONS

Reconstructive surgery following the resection of maxillomandibular lesion is very

important. Excision of large benign tumors and malignant tumors always leaves major defects that cannot be repaired with

conventional reconstructive techniques. Free flap reconstruction is a flexible reconstructive option that can overcome the limitation of conventional approach and restore the essential functions and aesthetics of the facial. The implementation of microsurgery technique at Hanoi National Hospital of Odonto-Stomatology has been carried out for only 12 years but rapid and significant progress has been made.

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