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The aim of this thesis is to define the role of head and neck reconstruction with the infrahyoid flap in the era of free flaps.

The thesis is structured in 9 chapters, **chapter 1** displays a general introduction on head and neck squamous cell carcinoma, with a brief overview on the peculiar characteristics of this cancer and its surgical treatment, announcing the reasons why the role of infrahyoid flap will be investigated throughout the following chapters of the thesis.

In **chapter 2** some general aspects of the decision making process when choosing between a free flap and an alternative pedicled flap reconstruction are addressed. The overall superiority of microvascular reconstructions in terms of restoration of form and function is not a matter of argument; nevertheless, in the philosophy of a tailored surgical approach based on specific patient's conditions, this chapter underlines the helpfulness of alternative pedicled flaps even in modern head and neck reconstructive surgery.

Chapter 3 is a comprehensive review of all published papers about the infrahyoid flap, highlighting the usefulness of this reconstructive method and the particular scenarios in which it can even compete with free flaps. Contrasting with the most popular myocutaneous pedicled flaps for head and neck reconstruction (pectoralis major, latissimus dorsi, trapezius), the infrahyoid flap is thin and pliable and this characteristic makes it very suitable for effective repair of small/medium sized defects of the oral cavity and the oropharynx, combining the same functional results that would be provided by pliable fasciocutaneous free flaps with the simplicity and ease of a pedicled flap surgery.

Chapter 4 shows how the infrahyoid flap can represent a valid alternative to the free radial forearm flap in head and neck reconstructions. In a series of 13 patients, 12 squamous cell carcinomas arising from the oral cavity and oropharynx and 1 Merkel cell carcinoma of the submental skin, reconstruction with the infrahyoid flap was used as an alternative to free radial forearm flap. A new personal technical change was introduced in the harvesting of these flaps and proved to be successful, so creating the new infrahyoid facio-myocutaneous flap; all reconstructions healed quickly without wound complications and with good functional results, all donor sites were closed primarily with good aesthetic results.

Chapter 5 highlights how this flap is particularly trustful in fragile patients. In a series of 34 consecutive oral cavity and oropharyngeal reconstructions after squamous cell carcinoma resection, healing and functional results of 18 patients in poor general conditions, unfit for a microvascular procedure and therefore receiving infrahyoid flap reconstruction, were as good as those of the 16 patients in good general conditions receiving microvascular free radial forearm flap transposition: in this paper a new personal technique for base of tongue reconstruction using the infrahyoid flap was described.

Chapter 6 shows the reliability of the infrahyoid flap for soft palate reconstructions as alternative to free radial forearm flap or maxillofacial prosthesis. In a series of 23 consecutive patients with squamous cell carcinoma involving the oropharynx, reconstruction of defects encompassing a soft palate resection not extending beyond the midline was achieved with the infrahyoid flap. Every reconstruction healed quickly without major wound complications; the functional results evaluated by speech and swallowing capacities were good for 17 patients, fair for 4 patients and bad for 2.

Chapter 7 demonstrates how the infrahyoid flap produces a savings reducing healthcare costs in times of increasing economic constraints. Fifty-four consecutive patients underwent soft tissue reconstruction of oral cavity and oropharyngeal defects. The cohort included 16 patients in good general conditions that received free radial forearm flap reconstruction; 18 high-risk patients that received a reconstruction with infrahyoid flap; 20 patients that received temporal flap (10 cases) or pectoral flap (10 cases) reconstruction. Pedicled alternative flaps were used in elderly, unfavorable, and weak patients, where usually the medical costs tend to rise rather than decrease. The health care costs of the three groups were compared, calculating real costs in each group from review of medical records, and operating room registers, and calculating the corresponding DRG-system reimbursement. A statistically significant difference among groups was found, the analysis showed that the use of alternative not-microvascular techniques, in high-risk patients, was functionally and oncologically sound, and produced a saving. In particular, the infrahyoid flap ensured excellent functional results, accompanied by the best economic performance in the worst group of patients. The data reflected also a huge disconnection between the DRG reimbursement system and real treatment costs.

Chapter 8 contains a discussion on the clinical aspects that might overburden a microvascular reconstructive procedure, justifying the consideration of proposing an alternative pedicled flap reconstruction instead. The specific advantages of the infrahyoid flap are displayed and in this light its possible use in combination of transoral robotic surgical resection for oropharyngeal tumors is presented and discussed as future perspective.

Chapter 9 contains the summary of the thesis in English, Italian and Dutch.